THE

JOURNAL OF GAS LIGHTING.

PUBLISHED QUARTERLY.

WITH AN INTERMEDIATE SUPPLEMENT ON THE 10TH OF EACH INTERVENING MONTH.

No. 22.] LONDON, NOVEMBER 11, 1850. [PRICE 1s.

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TO CORRESPONDENTS.

S. B. and others.—*The address of Mr. D. O. Edwards is No. 5, Sidney-place, Brompton.*

Enquirer, Reform Club, *should have communicated to us confidentially his name.*

Mr. Hodgett's *letter reached us too late for insertion.*

Experimentum Crucis *has addressed us a letter with an injunction to insert it entire or not at all. We conform with his instructions by not publishing it, for reasons which we have communicated to him privately.*

NOTICE TO AMERICAN READERS.

Complete series of the JOURNAL may be had of Messrs. D. Appleton and Co., 200, Broadway, New York, to whom all subscriptions for the United States, after the 10th of January, 1851, must be paid.

NOTICES.

With the view of making the termination of the annual subscription coeval with the close of the year, and starting fair for the year 1851, we shall publish two 24-page numbers in November and December instead of one 24-page and two 8-page ones. It has been suggested to us that ample materials exist for a 24-page number monthly, and we may probably be induced to try the experiment next year.

All communications and orders for Advertisements to be addressed to the Editor, 32, Bucklersbury, London.

Back numbers exceeding three months' date will in future be charged double price, unless six or more consecutive numbers are taken at the same time. Nos. 6, 12, 13, 15, and 16, are nearly out of print, and can in future only be obtained with complete sets of the Journal.

The Editor will be particularly obliged by his friends forwarding to him Notices of all Meetings, Trials, or Appeals which it may be interesting to the Gas World to have reported.

Circular to Gas Companies.

The Editor may be consulted on all subjects connected with the supply and manufacture of gas, or the alteration and improvement of gas apparatus, and the construction of new works.

IF the remarks which have been elicited from the different branches of the press, by the return made by the Incorporated Gas Companies of the United Kingdom, in compliance with Mr. Hume's motion, are to be taken as evidence of the extent of popular knowledge upon what has been dignified by the title of "THE GAS QUESTION," it is quite evident that little progress in the education of the public upon this subject has been made during the last two years, and that misrepresentation and ignorance still control the movements of the organs and leaders of the agitation to which we have of late been witnesses. The following extract from a leading article of the *Morning Advertiser* of the 7th ult., copied into the *Mining Journal* (a periodical, by the way, which *ought* to have been better acquainted with the subject than it appears to be), is an instance of the ignorance of such writers, and of the absurd conclusions into which such ignorance sometimes draws them:—

"If the price of coal regulates the price of gas, which was pretty often alleged during the late agitation of the question of a supply of gas to the metropolis, it seems to be a rule that admits of the most remarkable exceptions. As an example, we will take the first name in the return from gas companies just published. Accrington pays 9s. 3d. and 14s. 3d. per ton for coals, and charges 7s. to 4s. per 1000 cubic feet. We must suppose the proportion between the prices of coals and gas to be perfectly just. It gives on the average 11s. 9d. for coals, and demands 5s. 6d. for gas. Then, the next place, Ashton-under-Lyne gives 7s. 6d. and 14s. 0d., or an average of 11s. for coals, and charges 5s. 6d. for gas. On this difference in the price of coals the Ashton Company have £10 rate per cent. of dividend, while the Accrington Company have only £5. As the coals at Ashton are 11s., the gas should be only 5s. 3d., on the supposition that the ratio of gas to coals at Accrington is fair to the consumers.

"On the same supposition, Croydon might charge 8s. 10d. for gas, as the coals cost 19s.; but the charge is only 7s. The amount of paid-up capital here is £20,000, and the rate per cent. of dividend is £5.

"More striking differences than the above are exhibited in the return, but our only object was to show the want of regularity. We have always understood the proportion at Manchester to be reasonable. In that city the gasworks are public property, and the profits are devoted to the public service. The gas is of a superior quality, and the management of it has been productive of much profit and advantage to the inhabitants. The price of coals is returned at 15s. 6d., or exactly the same as the price returned by the Commercial and Ratcliff Companies in London. In Manchester the price of gas is 4s. 9d.; but these companies charge 6s., or 1s. 3d. more, for every 1000 feet consumed. Another very striking difference is found in Manchester, the rate per cent. of dividend is £10 3s., the highest except at Wigan; but the rate returned by the Commercial Company is £6, and by the Ratcliff £5. Wigan returns the rate per cent. of dividend £12 10s., but then, with coals at only 9s. 4½d. per ton, the gas is 6s. and 5s. It is perfectly clear that if Manchester can make a large dividend of 10 per cent. with gas furnished at 4s. 9d., produced from coals at 15s. 6d., the London Companies, which pay different prices, ranging between 13s. 11d. and 20s. 5d., and which (excepting the City of London) charge 5s. 10d. to 8s. 6d., must realize very large profits. Two, however, return "nil" in the column of "Rate per cent. of last dividend;" one, £4 10s.; and another, £5; and the rest, £6.

"The City of London Company merits especial notice; it pays 15s. 9d. for coals, or 3d. per ton more than Manchester, and charges 4s., or 9d. less than Manchester, for gas. Manchester has £274,427 paid-up capital, and the City of London, £300,000. The rate per cent. of dividend is very nearly the same. In 1847, the charge for gas was 7s., and the price of coals 17s. 4d. for the City Company; in Manchester the gas was 6s. 6d., and the coals 15s.; in 1848, gas, 6s., and coals, 17s., in the City, and in Manchester, 4s. 9d., gas, 15s. 6d., coals; in 1849, 5s. from Midsummer, but reduced to 4s. for gas in the City; coals, 15s. 9d.; the prices in Manchester remaining the same.

"The other London companies appear to have computed the charge for gas from the ratio existing between the price of gas and coals in some place or other where the latter are dear, and where, consequently, it is but reasonable that the gas should be proportionably high. Thus, at Oxford, the coals cost 22s. 4d., and the gas, 8s. 4d.: ten of our companies pay on the average 15s. 5d. per ton of coals, from which the gas, on the Oxford proportion, should be 6s. 9d.; it is but 6s.: but when 6s. are compared with either the City of London, 4s., or the Manchester, 4s. 9d., both paying more for coals, we feel satisfied that the charges of all the companies, except the City of London, are most exorbitant. *We, therefore, recommend the institution of such an agitation as will cause the London companies to be more reasonable.*"

It will be in the recollection of many of our readers that, in March, 1848, this newspaper asserted that gas was sold at Croydon at 2s. 6d. per 1000 feet, and its conductors thought proper to refuse any rectification of the error, even when informed, on authority, that the lowest price at which gas had ever been supplied in that place was 7s. One would have supposed that before venturing to "recommend the institution of such an agitation as will cause the London companies to be more reasonable," the conductors of a newspaper

claiming to be considered independent and well-informed, would have taken care to assure themselves whether, since 1849 (to which period only the return extended), any reduction had been made by the companies in question. Had they instituted such an inquiry they would have found that, when their article was penned, all those companies, except one, had already reduced their price to private consumers to the extent of above 16 per cent., and that the remaining one had announced a similar reduction to commence on January 1, 1851.

But the manner in which the subject is treated in the above extract is even more objectionable still in another point of view. According to such writers the relative price of gas in different localities ought to be founded on an equation of which the basis is the relative price of coals. But, as coals are only one item of the cost, and as the proportions which they bear to the total expenses vary from 10 to 50 per cent., the remaining 50 or 90 per cent., as the case may be, would, by the admission of such an absurdity as this writer proposes, be subjected to the same rule-of-three sum, these other charges being, in fact, nearly constant (in towns of similar population and extent), whatever the price of coals may be. Take the City of London, for instance, and compare it with Newcastle. In the latter town coals are quoted at 5s. 6d., and the average price of gas as 3s. 6d. Transport these coals to London, and their cost becomes 15s. 6d; so that if the rule laid down by this sagacious writer holds good, the price of gas should be at least 15s. 6d., instead of 4s., which it really is. Coal, in truth, enters only, in the cost of gas in these places, for 3½d. per 1000 feet in the one case, and for 10d. in the other, the other items of the cost of gas consisting of charges over which its price has no influence whatever.

We must confess, however, that there is some excuse for these blunders, seeing the general ignorance that prevails on the subject, and that many persons who have some slight acquaintance with it, have themselves fallen into the same mistake. Our chief complaint is, that such persons trouble themselves on a matter which they do not understand, and thus mislead and injure others.

Another source of error arises from there being no distinction drawn in the return between the different descriptions of coals used, each varying as they do in quality, according to the basin from whence they are derived. To institute any comparison, based on the price of coals alone, between Glasgow and Gloucester, the former using a material the residuary products of which are of little value, while, in the latter, they return nearly one-half of the first cost, would be unjust to the former. To make a fair one, any comparison should be limited to towns using the *same description of coal*, as, in such case, it is to be presumed that the same quantity of gas will be yielded, and the residuary products will bear nearly the same proportion in value to the first cost of the coal. Few persons have the opportunity of making such a classification for their own information, as will bring into one group the several towns embraced in the return drawing their supplies of coal from the same source; and many of our friends have been of opinion that we could not render a more essential service to gas companies at the present crisis, than in thus grouping this return, indicating at the same time, in general terms, the quality of the gas yielded, and the value of the residuary products of each description of coal, so as to allow of a fair comparison being drawn by persons who are not practically acquainted with the subject—such persons, in fact, as the writer of the article above alluded to. We set about the task of arranging such a table with some hesitation, knowing the delicate susceptibility of every manager of a gas work when the quality of his gas is in question; but we trust we have accomplished it with such a due regard to justice and accuracy as will satisfy every one. Should any error, however, have crept in, we shall be obliged by immediate notice, so that it may be corrected in a later edition of this month's Journal. We were pressed in several instances to quote the present prices of gas, many reductons having lately taken place; but being unable to ascertain them in all cases, we have taken the prices as they appear in the returns, which is up to the end of 1849.

GROUP I.

SCOTCH CANNEL.

Five cubic feet per hour of this gas giving a light equal to from 20 to 33 standard candles, according to the quality of the cannel, and the circumstances under which the distillation is effected.

Value of the surplus residuary products in the towns enumerated, from 5 to 20 per cent. of the cost of the cannel.*

Name of Company.	Rates per 1000 Cubic Feet at which the Gas has been supplied in each year.			Price of Coals in 1849.	
	1847.	1848.	1849.	Per Ton. Coal.	Cannel.
	s. d.	s. d.	s. d.	s. d.	s. d.
Hamilton	From Sept. 3, 1847, to Dec., 1848, 6s. 6d.; since Dec., 1848, 5s.				12 8 and 12 5
Paisley	6 0	6 0	6 0		12 9½
	Less discount, 5s. 9½d.				
Glasgow Gas Light Company	5 0	5 0	5 0		14 11
Glasgow City and Suburban Gas Company	5 0	5 0	5 0		14 11
Edinburgh Gas Light Company	6 6	6 6	6 6		17 10½
Dundee Gas Light Company	5 5	5 5	5 5		18 6
Dundee New Gas Light Company	6 0	6 0	6 0		18 6
	Subject to discounts varying from 2½ to 20 per cent. according to the consumption.				
Edinburgh and Leith Gas Light Company	6 6	6 6	6 6		18 6
Inverness (Gas and Water)	10 0	10 0	10 0		24 4

GROUP II.

NEWCASTLE CANNEL.

Five cubic feet per hour of this gas giving a light equal to from 22 to 25 standard candles, according to the circumstances under which the distillation is effected.

Value of the surplus residuary products, 30 per cent. of the cost of the cannel.

London:—					
Western			8 0		21 0

GROUP III.

WIGAN CANNEL.

Five cubic feet per hour of this gas being equal to from 20 to 23 standard candles, according to the circumstances under which the distillation is effected.

Value of the surplus residuary products in the towns enumerated, from 20 to 25 per cent. of the cost of the cannel.

Wigan	Shops 6s., mills 5s.				9 4½
Bolton	6 0 to 4 6	5 6 to 4 6	5 0 to 4 6		10 6
	Street lamps at so much per light.				
Blackburn	6 0 to 4 0	6 0 to 4 0	5 0 to 4 0		11 5
Middleton	6 6	6 2	5 6		11 9
Salford	6 0 5 6, and 5 0 in 1847-48-49. Reduced in June, 1849, to 5s., 4s. 9d., and 4s. 6d.				12 0
St. Helen's	8 0	8 0	6 8		12 6
Birkenhead	7 6	7 6	7 6		13 0
	Public lamps £4. 2s. 6d. each per annum.				
Heywood	5 2½	5 8½	5 4		13 5
Rochdale	6 0	6 0	6 0	7 3	14 3
	Subject to discount at rates varying from 5 per cent. when the annual consumption amounts to £30; to 25 per cent. when such consumption amounts to £200.				
Accrington	10 0 to 6 0	8 0 to 4 10	7 0 to 4 0	9 3	14 3
Liverpool:—					
The late Liverpool Gas Light Company	4 6	4 6			
The late Liverpool New Gas and Coke Company, formerly the Liverpool Oil Gas Light Company	4 6	4 6			
The Liverpool United Gas Light Company			4 6		14 6
Ashton-under-Lyne	6 0	6 0 & 5 6	5 6	7 6	14 6
	With discount at rates varying from 2½ per cent. to 30 per cent.				
Stockport	5 3	4 9	4 9		14 6
Preston	6 0 to 5 0	6 0 to 5	5 3 to 4 4½		15 0
Stalybridge	6 0	6 0 to 5 6	5 6		15 0
	Subject to discount at rates vary-				

* The Scotch cannels vary considerably both in the quality of the gas they yield, and in the value of their residuary products. They have been classed as follows by the experienced manager of a large Scotch gas work:—

	Candles.	Ft. pr. Ton.	Residuary products worth
Old Wemyss 5 feet equal to	33	9,625	10 per cent. of cost of coal.
Lesmahago, 1st and 2nd var.	30	10,800	20 ,,
Monkland	30	10,500	20 ,,
Marquis of Lothian	30	10,000	17½ ,,
Cappledrae	30	9,800	15 ,,
Lesmahago, 3rd sort	28	10,600	20 ,,
Methil	27	9,000	5 ,,
Kinniel	24	10,400	20 ,,
Grange	24	10,400	20 ,,
Lochgelly	20	9,300	17½ ,,

Kirkness (1st and 2nd), Lumphinary, Arniston and Skaterig, and Blackbraes, not classed. The latter is spoken of as yielding a very large quantity of gas, 11,000 to 12,000 feet per ton, of a quality equal to Old Wemyss; but the residuary products are worthless.

Note.—The Lesmahago, Monkland, Arniston and Skaterig, are found in the Vale of the Clyde, on the west coast. The whole of the others are from the valley of the Frith of Forth, on the east coast.

Name of Company.	Rates per 1000 Cubic Feet at which the Gas has been supplied in each Year.			Price of Coals in 1849.	
	1847.	1848.	1849.	Per Ton. Coal.	Cannel.
	s. d.	s. d.	s. d.	s. d.	s. d.
	ing from 2½ per cent. when the annual account amounts to £20; to 30 per cent. when the annual account amounts to £500.				
Runcorn	7 6 to consumers of less than 100,000 cubic feet, and 6s. 4½d. to consumers above that amount.				15 3
Manchester	5 6	4 9	4 9		15 6
Oldham	No return.				
Over Darwen	No return.				
Radcliffe and Pilkington	No return.				

GROUP IV.

NEWCASTLE CAKING COAL.

Five cubic feet per hour of this gas giving a light equal to from 11 to 15† standard candles, according to the quality of the coal, and the circumstances under which the distillation is effected. *(Some of these Companies use a portion of cannel, by which the illuminating power is increased to 15 or 16 candles.)*

Value of the surplus residuary products in the towns enumerated, from 50 to 55 per cent. of the cost of the coal, except in those marked †, where they compete with cheaper coals, and are consequently of less value.

Name of Company.	Rates per 1000 Cubic Feet at which the Gas has been supplied in each Year.			Price of Coals in 1849.
	1847.	1848.	1849.	Per Ton. Coal.
	s. d.	s. d.	s. d.	s. d.
Newcastle and Gateshead	4 0 to 3 7	4 0 to 3 7	4 0 to 3 0	5 6
	Public lamps at the rate of about 1s. 1d.			
Stockton	7 6	6 8	5 10	5 9
Hartlepool	6 8	6 8	6 8	Not stated.
Rochester, Chatham, and Strood	7 0	6 0	6 0	13 6
	(Reduced to 5s. 6d. in 1850.)			
Boston	8 0	8 0	7 0	14 0
Devonport	5 6	5 6	6 0	14 9
	Her Majesty's dockyard is supplied at 3s. 3d., and the public lights at about 3s., per 1000 cubic feet.			
Ipswich	7 0	6 0	6 0	15 3
London:—				
British	6 0	6 0	6 0	15 3
Chartered	7 0 & 6 0	6 0	6 0 & 5 0	15 4
	1849—From Christmas 1849 the company have agreed to supply gas in the City of London at 4s., and elsewhere from Lady-day next at 5s., per 1000 cubic feet.			
City of London	7 0	6 0	5 0	15 9
	1848—From Lady-day.			
	1849—From Midsummer; reduced to 4s. at Christmas.			
Commercial	6 0	6 0	6 0	15 6
	Public lights at a lower rate.			
Equitable	7 0	7 0 & 6 0	6 0	13 11
Imperial	7 0	7 0 & 6 0	6 0	15 0
Independent	6 0	6 0	6 0	16 0
London	8 0 & 7 0	7 0 & 6 0	6 0	15 3
Phœnix	8 0	7 0 & 6 0	6 0	14 5
Poplar	6 0	6 0	6 0	17 6 average
Ratcliff	7 0	7 0	6 0	15 6
South Metropolitan	8 0	7 0 & 6 0	6 0	16 6
Plymouth and Stonehouse	6s. to private consumers, 3s. 6½d. to the Victualling-yard, Naval Hospital, and Marine Barracks. Public lights £2. 14s. per light per annum, estimated at 2s. per 1000 C. F.			15 6
Portsea	7 0	6 6	6 6	16 0
Brentford	8 0	8 0 to 6 0	8 0 to 6 0	16 0
Dover	7 6	7 6	7 6	16 0
Dublin:—				
†Alliance and Dublin Consumers	7 6, 6 8, and 5 10	5 10	5 10	16 3
†Hibernian	(See United Gen. Gas Company.)			
Southampton	1849, 6 0; public lamps about 3 2			16 6
Exeter	7 6 red. to 7 0	7s. red. to 6 6		17 0
Cambridge	8 0	8 0 to 7 0	7 0 to 6 0	17 2
	Town lamps £4. 10s. each.			
	The price will be still further reduced at Midsum. 1850 to 5s. 6d.			
Norwich	6 8 & 5 10	5 10	5 10	17 4
Isle of Thanet	7 6	7 6	7 6	17 6
Stamford	10 0	10 0	8 0	18 0
	Public lamps at the rate of 6s.			
Croydon	7 0	7 0	7 0	19 0
Bury St. Edmund's	10 0	10 0	10 0, subsequently reduced to 8s. 4d.	19 6
†United General Gas Co. (Hibernian)	7 6 & 5 10	5 10	5 10	20 5
†Oxford	8 4	8 4	8 4	22 4
Darlington	The Act incorporating this company having only recently come into operation, no particulars can be furnished.			
	(See United Gen. Gas Company.)			
Cork	No return.			
Brighton	No return.			
Brighton and Hove	No return.			
Canterbury	No return.			
Newport (Isle of Wight)	No return.			
†Reading (Old)	No return.			
Sunderland	No return.			

† To obtain gas of the latter quality, the quantity must be limited to 9000 feet per ton, from the best description of Newcastle caking coal.

GROUP V.

DERBYSHIRE CAKING COAL, (Staveley, &c.)

Five cubic feet per hour of this gas giving a light equal to from 12 to 15 standard candles, according to the circumstances under which the distillation is effected.

Value of the surplus residuary products in the towns enumerated, from 40 to 45 per cent. of the cost of the coal.

Name of Company.	Rates per 1000 Cubic Feet at which the Gas has been supplied in each Year.			Price of Coals in 1849.	
	1847.	1848.	1849.	Per Ton. Coal.	Cannel.
	s. d.	s. d.	s. d.	s. d.	s. d.
Chesterfield	7 0	7 0	7 0	6 6	
Nottingham		5 5 to 4 2	5 0 to 3 9	8 0	
Derby	6 6	6 6	6 6	9 2	
	Subject to discount at rates varying from 10 per cent. off the first 10,000 cubic feet, to 40 per cent. off all above 60,000 cubic feet.				
Mansfield	6 8	6 1	5 10	9 3	
Louth	8 0	8 0	8 6	9 7½	
	1847 and 1848—Public lamps, £2. 15s. each.				
	1849—Public lamps, £2. 7s. 6d. each.				
Leicester	5 6½ to 4 8	5 6½ to 4 8	5 6½ to 4 8	11 0	
Lincoln	7 6	7 6	7 6 to 5 0	12 0 average.	
Newark	8 4 and 7 6	8 4 and 7 6	7 6 & 5 10	13 6	
	1847 and 1848—When finding their own meter, and 10s. when using the company's meter.				
	1849—When finding their own meter, and 1s. extra when using the company's meter.				
Northampton	No return.				

GROUP VI.

YORKSHIRE CAKING COAL.

Five cubic feet per hour of this gas giving a light equal to from 10 to 13 standard candles, according to the circumstances under which the distillation is effected. *(In the towns marked ‡ a portion of Yorkshire cannel is used, by which the illuminating power is increased to 14 or 16 candles.)*

Value of the surplus residuary products in the towns enumerated, from 45 to 50 per cent. of the cost of the coal.

Name of Company.	Rates per 1000 Cubic Feet at which the Gas has been supplied in each Year.			Price of Coals in 1849.
	1847.	1848.	1849.	Per Ton. Coal.
	s. d.	s. d.	s. d.	s. d.
Barnsley	5 6	5 6	5 6	8 4
	With discount at rates varying from 2½ per cent. to 22½ per cent.			
Wakefield	5 0	4 6	4 0	5 4
York	6 8	6 8	5 6 to 4 6	7 5
Pudsey	6 8	6 8	6 8	7 5
‡Leeds (New Gas Company)	6 0	5 0	5 0	7 6
	1847—Subsequently reduced to 5s.			
	1848 and 1849—Subject to discount of 2½ per cent. on half-yearly payments of from £5 to £15, and an additional 2½ per cent. on every additional £15 up to 25 per cent.			
‡Rotherham	6 8 to 5 4	6 0 to 5 2	5 10 to 5 0	7 6
Halifax	1847—6s., with discount from 2½ to 50 per cent.			7 11½
	1848 and 1849—5, with discount from 2½ to 25 per cent.			
Dewsbury	7 6 to 6 0	6 8 to 5 4	5 10 to 4 8	8 0
Bradford (York)	6 0	5 0	5 0	8 0½
	Net price after discount—— 5s. 2½d., 4s. 3½d., 4s. 4½d.			
Burnley	5 3	5 3	5 3	8 1
Shipley	8 0	8 0	6 8	8 1 average
Bingley	7 0	7 0	7 0 & 6 0	8 2½
‡Sheffield	5 10 to 4 9½ in each year			8 9
‡Leeds (Gas Light Company)	6 0	5 0	5 0	9 1
	1847—Reduced to 5s. on June 15.			
	1848 and 1849—With discount at rates varying from 2½ per cent. when the half-yearly account amounts to £5; to 25 per cent. when such account is upwards of £135.			
Holmfirth	7 6	7 6	7 6	9 11
Harrogate			8 4	11 3
Kingston-upon-Hull	6 8, reduced to 5 6 in April, 1849			11 6
Grimsby, Great	10s. red. to 8 4	8 4	8 4 red. to 7 6	12 4½

GROUP VII.

LANCASHIRE CAKING COAL.

Five cubic feet per hour of this gas giving a light equal to from 10 to 12 standard candles, according to the circumstances under which the distillation is effected.

Value of the surplus residuary products, from 45 to 50 per cent. of the cost of the coal.

Name of Company.	Rates per 1000 Cubic Feet at which the Gas has been supplied in each Year.			Price of Coals in 1849.
	1847.	1848.	1849.	Per Ton. Coal.
	s. d.	s. d.	s. d.	s. d.
Warrington	8 4	8 4	8 4	8 11
	Subject to discount at rates varying from 19 per cent. (or 6s. 9d. per 1000 cubic feet) when the consumption is under 12,000 feet; to 46 per cent. (or 4s. 6d. per 1000 cubic feet) when the consumption amounts to 500,000 cubic feet and upwards.			

GROUP VIII.

CUMBERLAND CAKING COAL.

Five cubic feet per hour of this gas giving a light equal to from 10 to 12 standard candles, according to the circumstances under which the distillation is effected. (*At Belfast portions of Scotch and Wigan cannel are used, by which the illuminating power is increased from* 12 *to* 15 *candles.*)

Value of the surplus residuary products in the towns enumerated, from 35 to 40 per cent. of the cost of the coal.

Name of Company.	Rates per 1000 Cubic Feet at which the Gas has been supplied in each Year.			Price of Coals in 1849.	
	1847.	1848.	1849.	Per Ton. Coal.	Cannel.
	s. d.	s. d.	s. d.	s. d.	s. d.
Carlisle	5 0	5 0	5 0	5 0 Furnace	
				9 8 Retort	
Kendal	7 6	7 6	7 6	13 7	
Downpatrick	10 0	10 0	10 0	12 0	
Belfast*	* The Belfast Gas Works are carried on by an English company, meeting monthly in Leicester.				

GROUP IX.

GLOUCESTERSHIRE CAKING COAL.

Five cubic feet per hour of this gas giving a light equal to from 10 to 12* standard candles, according to the circumstances under which the distillation is effected. (*A portion of Welsh coal is mixed to improve the quality of the coke.*)

Value of the surplus residuary products, from 30 to 35 per cent. of the cost of the coal.

Bristol	6 0	6 0	6 0	8 6
	With discount at rates varying from 7½ per cent. (or 5s. 6½d.) to 20 per cent. (or 4s. 9½d.); special contracts 4s. 6d.			
Bristol and Clifton	No return.			

GROUP X.

CHESHIRE CAKING COAL.

Five cubic feet per hour of this gas giving a light equal to from 10 to 12 standard candles, according to the circumstances under which the distillation is effected.

Value of the surplus residuary products in the towns enumerated, from 20 to 25 per cent. of the cost of the coal.

Macclesfield	6 0 to 4 4	6 0 to 4 4	5 6 to 4 3	10 7
Glossop	5 5	5 5	5 5	12 0
New Mills and Hayfield	No return.			

GROUP XI.

SOMERSETSHIRE CAKING COAL.

Five cubic feet per hour of this gas giving a light equal to from 9 to 10 standard candles, according to the circumstances under which the distillation is effected.

Value of the surplus residuary products in the towns enumerated, from 40 to 45 per cent. of the cost of the coal.

Wells (Somerset)	8 0	8 0	8 0	10 0
	Public lights at £4 each per annum, or 4 3 per 1000 cubic feet.			
Bath	4s. 6d. to 7s., with discount at rates varying from 5 per cent. to 20 per cent.; and 2s. 1½d. for public lamps.			13 0
Reading (Union)	No return.			

GROUP XII.

STAFFORDSHIRE CAKING COAL.

Five cubic feet per hour of this gas giving a light equal to from 9 to 10 standard candles, according to the circumstances under which the distillation is effected. (*In the towns marked ‡ a portion of Derbyshire caking coal is used, by which the illuminating power is increased to* 12 *or* 14 *candles.*)

Value of the surplus residuary products in the towns enumerated, from 35 to 40 per cent. of the cost of the coal.

Congleton	7 0	7 0	7 0	8 4
	and 1s. extra when the consumer does not pay for the meter; with discount at rates varying from 2½ per cent. when the account reaches £10 per annum; to 15 per cent. when it attains £150 per annum.			
Bilston	6 0	6 0 to 4 6	6 0 to 4 6	9 6
Birmingham (West Bromwich)	6 0 to 3 4½	6 0 to 3 4½	6 0 to 3 4½	8 11
‡Birmingham (Old)	6 0 to 3 4½	6 0 to 3 4½	6 0 to 3 4½	15 0
Dudley	5 0	5 0	5 0	8 0 Common
				10 0 Best
Wolverhampton	5 0 and 4 6	5 0 and 4 6		11 0 average
Newcastle-under-Lyme	6 8	6 8	6 8	11 4
	The greater portion of the consumers are by contract.			
Stafford	8 6 to 6 6	8 6 to 6 6	7 6 to 5 6	12 9
Worcester	6 0	6 0	6 0	13 0
Shrewsbury	7 1	7 1	6 8 to 6 3	13 1
Kidderminster	10 0 to 6 0	9 0 to 6 0	8 0 to 5 6	14 0
†Coventry	7 3	6 4½	5 6	15 0
‡Leamington Priors	9 0 to 7 8	6 9 to 6 0	6 9 to 6 0	16 0
Warwick	10 0 and 9 0	9 0 and 8 0	8 0	20 0

GROUP XIII.

SOUTH WALES AND DEAN FOREST CAKING COAL.

Five cubic feet per hour of this gas giving a light equal to from 8 to 9 standard candles, according to the circumstances under which the distillation is effected. (*In the towns marked ‡ a portion of Derbyshire caking coal is used, by which the illuminating power is increased to* 10 *or* 12 *candles.*)

Value of the surplus residuary products in the towns enumerated, from 45 to 50 per cent. of the cost of the coal.

Name of Company.	Rates per 1000 Cubic Feet at which the Gas has been supplied in each Year.			Price of Coals in 1849.	
	1847.	1848.	1849.	Per Ton. Coal.	Cannel.
	s. d.	s. d.	s. d.	s. d.	s. d.
Llanelly	7 9	7 9	7 9	7 10	
Newport (Monmouth)	7 1	7 1	7 1	8 3 average	
	Public lights, 3s. 3d. in each year.				
Cardiff	8 0 & 7 0	7 0	6 6 & 6 0	ditto	8 6
	Reduced in June, 1847, to 7s., 6s. 6d., and 6s.				
Bridgewater	8 4 & 7 6	7 6	7 6	12 0	
Taunton	7 0	7 0	7 0	12 6	
	Subject to a discount of 5 per cent. when the consumption exceeds £25 per annum, and 2½ per cent. when from £15 to £25 per annum.				
‡Gloucester	1847—public lights, £2. 6s. 1848 and 1849—private lights, 6s.			15 0 average	
†Cheltenham	4 7½	4 8½	4 7½	16 6	
Hereford	Not stated.			17 0	
Swansea	No return.				

In preparing the foregoing table, we have grouped the towns:—First, according to the districts or basins from which the coal used is extracted, commencing with those yielding gas of the highest illuminating power; and, if an equality between two descriptions of coal exists in this respect, giving the preference to that yielding the most valuable residuary products; and, Second, arranging the towns in the several groups, according to the price of coals, commencing with the lowest, and ending with the highest. The values assigned to the residuary products are there procurable within the districts embraced in the group. Art and nature (the one, by her artificial channels of communication, and the other, by the distribution of her minerals) have, however, combined to create certain limits within which certain materials placed at our command may be so treated as to produce the greatest quantity of light at the smallest cost: and the talent of the gas engineer is employed in searching for and in obtaining these results. Instances, however, occur where the rich products of one district are carried beyond their natural boundaries into others producing those of a lesser quality. Thus, we find the coals of Derbyshire carried into Birmingham (though she has her own coals at her door), and even as far as Gloucester and Cheltenham, to enrich the poorer gases produced from the coals of the neighbouring mines of Staffordshire and Wales. So, again, we find the Scotch and other cannels transported to London at great cost to add strength to the gas from Newcastle coal, and, if gas could be sold by its light-giving properties instead of by its bulk, this operation would be carried on to a much greater extent than it has hitherto been. The ignorant mob has, however, run its head against having gas at a low price; and, till the education of the masses upon this subject has made more progress, it seems almost useless to tell them that by improving the quality and augmenting the price they may put money in their pockets. It must, however, be borne in mind, that in transporting a rich material for the production of gas beyond the district which nature has assigned to it, its residuary products may come into competition with superior ones of some other district, so as to render them of less value than they would have been at home. Take Lesmahago cannel, for instance, which at Glasgow costs 16s. 6d. per ton, the residuary products, besides the gas, diminishing the cost of material to 13s. 3d. for 10,800 feet of gas, or nearly 15d. per 1000 feet. The same material carried to London would cost something like 29s., or 27s., after deducting the residuary products, leaving 2s. 6d. per 1000 feet as the cost of coal only, against 10d., the present cost of Newcastle coal. Lesmahago gas must, therefore, be sold in London 1s. 8d. dearer than Newcastle gas, presuming that the relative costs of the coals remain without change; a contingency not very likely to happen, seeing that, within three years, Lesmahago cannel has been sold in the Glasgow market at 25s. per ton; and that the same would again occur should any extraordinary demand arise beyond the immediate means of the coalowners to supply. This uncertainty in the supply will ever be the great drawback against the general use of cannel coal-gas in the metropolis; but it is well known that the metropolitan companies have had their attention directed to the subject, and that the Imperial Company has, for some time past, used it in large

* To obtain gas of the latter quality, the quantity must be limited to 7500 feet per ton of coal.

quantities; it has, however, been reserved for the Chartered Company to meet and grapple with this question in the most decisive manner, by offering to supply pure cannel coal-gas wherever it may be required by any of the authorities of the Westminster district at 6s. per 1000 feet. This district is peculiarly adapted for such an experiment; the Houses of Parliament, the clubs, and other places of resort of the aristocracy offering an ample field for the display of the illuminating qualities of such rich gas, and we shall watch its progress with much interest.

The chief difficulty we have had to encounter in the arrangement of the foregoing table has arisen from the want of some recognized standard of gaseous faith amongst the Engineers and Managers of gas works. Chemists prefer the chlorine test, but few gas managers have the means at command of resorting to such experiments. The same may be said of explosion with oxygen. Specific gravity is acknowledged on all hands to be worthless as a test of illuminating power when varying qualities of coal are used, unless accompanied by an analysis—an operation requiring more skill than even the test by chlorine. There remains, then, nothing but the photometer; and here even we are at fault, as at least a dozen different standards of value have been adopted by different experimenters. The Commissioners of Woods and Forests, acting, we should presume, on the advice of some one who had never tried a photometrical experiment on gas, prescribed for the use of their surveying officers a candle, which none of them could use. Other parties have experimented with candles of wax, sperm, and stearine, consuming all quantities, from 120 to 150 grains per hour; so that, what may have given fifteen with one would only be twelve by another standard. This want of uniformity has led us into a series of experiments with the view of selecting the *best standard*, in the hope that we may induce the gas companies of the United Kingdom to adopt it universally, and thus allow gas engineers to speak the same language when discussing the illuminating power of the several gases. Our experiments have led us to conclude that a carefully-made spermaceti candle, of uniform quality, with a plaited wick, consuming 120 grains per hour, fulfils all the necessary requirements, and some we have had expressly made for these experiments have not sensibly varied either in the quantity of sperm consumed, or in the intensity of the light given. We have taken measures to have a quantity of these candles made in a mould, stamped "STANDARD PHOTOMETRIC CANDLE," and an announcement will appear in the next Journal as to where they may be procured.

While upon the subject of the price of gas, it may be as well to notice the fact, that the 115 towns embraced in this return comprise all the *large* companies of the United Kingdom, and that the majority of the 600 or 700 not incorporated by special act of Parliament, and, therefore, not included in it, are small establishments, many of them making only one or two million feet of gas a-year, and few of them more than ten millions. In such, the same results cannot be obtained as in larger ones; for, where the consumption is below ten million feet, the expenses are rapidly augmented as the scale descends, till, in the smaller ones, of which there are so many instances in Scotland, 15s. per 1000 feet will not pay a larger interest than will 4s. in the City of London.

Many of our subscribers have solicited us to gratify their curiosity by some further details of the difficulties and accidents which the Great Central Consumers' Company have had to encounter. They must excuse us, however, if we disappoint them, as we feel that on this subject we have already said enough. We combatted the project fearlessly and vigorously; and we are now satisfied to await the issue of the experiment, with the full expectation that even its most ardent supporters will be compelled at an early period to admit the truth of the views we have so often put forth. The tact and industry they have displayed merited a better cause; and, however we may regret that so much treasure and talent should have been wasted in so profitless a speculation, or deplore that such indomitable energy and perseverance should have been exercised in so uncalled for a contest,—yet, having struggled into existence, they shall have at our hands a fair field for the demonstration of the soundness of those theories upon which they have built their hopes, and risked their fortunes. The balance sheets of the next two years will decide the question between us; but we trust they will be honestly prepared, and no attempt made to "make things comfortable" by any experiments in "cooking" them. Cooking by gas is on the increase; but the cooking of gas accounts is, we hope, on the decline, though we could point out instances where it has has been practised of late to some extent, and with some profit to the operators. A few of our readers may not have to travel far for such an example in their own experience.

The experiment which has been for some time past in progress at the Southport Gas Works, on the manufacture of resin and water, or hydro-carbon gas, has been watched with great interest by all parties connected with the manufacture of coal gas; and we have waited with some anxiety for the publication of the accounts of the commissioners under whose authority the experiment has been made. The treasurer's accounts have just been issued, extending from Nov. 12, 1849 (when the works were set in operation), to July 18, 1850; and though it is not easy to make up a profit and loss account from a treasurer's cash account, yet, with such further information as we have been able to collect, an approximate one may be formed, which will not be far from correct. The account of receipt and expenditure is as follows:—

SOUTHPORT GAS WORKS.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To cash brought from capital account	522	14	4	By cash, day labour	73	9	3
,, for gas	278	7	3½	,, coals and carting	45	14	10
,, for meters	63	5	0	,, resin and carriage	149	0	2
,, for service pipes	56	18	0½	,, charcoal	7	6	6
,, for rent of meters	4	0	4½	,, resin, oil, tar, and carriage	29	17	10
,, for rent of service pipes	1	4	6½	,, service pipes, taps, &c.	192	2	9
,, for resin casks and tar	4	16	4½	,, gas meters	109	0	0
,, for gas burners	0	10	7½	,, interest on hired money	201	9	2
,, for interest	15	17	8	,, carriage of sundry articles	11	19	7
,, for resin oil	2	16	6	,, paving	3	10	2
				,, red lead	1	14	10
				,, superintendent's salary	25	0	0
				,, printing & stationery	14	10	0
				,, for sundries	2	18	6
				By balance in treasurer's hands	82	17	2
	£950	10	9		£950	10	9

In addition to the above, we have ascertained,

1st. That the £522. 14s. 4d. brought from capital account is the balance of a sum of £3750 raised at 5 per cent. interest for the purposes of this work, and of which £82. 17s. 2d. remained in hand on July 13, 1850.

2nd. That the £278. 7s. 3½d. was received for gas at 7s. 6d. per 1000 feet, supplied up to May 12; that accruing from this date to July 13 still remaining due.

3rd. That the stock of resin on hand, and paid for in the charge of £149. 0s. 2d., was sufficient to carry on the work to Sept. 13 last.

Discarding, therefore, those charges which properly belong to capital account, and adding the probable receipts for gas sold for the two months from May 12 to July 10, and crediting the two months' surplus stock of resin, we shall arrive at a tolerably accurate estimate of the cost of carrying on the works from Nov. 12, 1849, to July 13 last.

£278. 7s. 3d. divided by 7s. 6d. represents the quantity of gas sold, being equal to 742,300 cubic feet in six winter months; and, if a twelfth be added for the two summer months (which is a very ample allowance), we obtain a total of 804,158 cubic feet, or £301. 11s. 3d. as the probable money value of the gas sold up to July 12.

The resin purchased amounts to £149. 0s. 2d., from which deduct one-tenth for the stock on hand, equal to the supply of the works from July 13 to Sept. 13; and its net cost will have been £134. 2s. 2d., representing, at 3s. per cent., 894 cwt. Now, 804,158 (the gas sold) divided by 894 gives within a fraction of 900 feet of gas sold for each cwt. of resin used, or 8 feet per pound. It must not, however, be overlooked, that this is the *net* product after deducting leakage, which appears to amount to about one-fifth of the gross quantity made, as we were informed that the register of the station meter exceeded a million feet (though the exact figures are not given), and our estimate of the quantity paid for is only 804,158 feet.

With these explanations, and making the requisite allowances for interest on money borrowed, and wear and tear, the profit and loss account, from Nov. 12, 1849, to July 12, 1850, would stand thus:—

Dr.	£	*s.*	*d.*
To Cash, day labour -	73	9	3
,, coals and carting -	45	14	10
,, charcoal - - -	7	6	6
,, resin used - - (resin, oil, tar, & carriage, £29. 17s. 10d., not charged as being expended in setting the works in operation)	134	2	2
,, part of Superintendent's salary - -	20	0	0
,, printing & stationery	14	10	0
,, sundries - - -	2	18	6
,, wear and tear at 6d. per 1000 feet -	20	2	1
,, interest at 5 pr cent. on £3750, being 2s. 6d. per 1000 feet on an estimated annual consumption of 1,500,000, or on 804,158 feet - -	100	10	5
	£418	13	9

Cr.	£	*s.*	*d.*
By Cash received for 804,158 feet of gas supplied at 7s. 6d.	301	11	3
,, resin casks and tar	4	16	4½
,, resin oil - -	2	16	6
Total receipts -	309	4	1½
Balance of expenditure over income on nine months' working, equal to nearly 2s. 6d. per 1000 feet additional on the gas sold - - -	109	9	7½
	£418	13	9

It would appear from this statement that the hydro-carbon gas ought to be sold at Southport at 10s. per 1000 feet to pay 5 per cent. interest on the money borrowed for establishing the works. It may be objected that this account is not credited with a large stock of valuable (?) products, such as resin oil, &c., which have accumulated during the nine months operations. Some attempt has certainly been made to dispose of them, as we see £2. 6s. 6d. credited from this source; but we maintain that, when twelve months have passed over without any market having been found for them, we are justified in considering the value set upon them as altogether fallacious and absurd. In fact, we are aware of an instance in the midland counties, where a similar experiment was tried, and the products have remained for two years on hand, till in the end it became requisite to put a stop to their further increase, by reconverting the establishment to a coal gas work.

Comment upon such figures is scarcely necessary. They amply bear out all we have asserted on this subject; and there we are disposed to take our leave of it, unless any new facts are brought forward which may again require further elucidation.

Correspondence.

SIEVES FOR DRY-LIME PURIFIERS.

Sir,—As economy is the order of the day in the manufacture of gas, you will oblige me by inserting in your next Journal the following description of the dry-lime purifier sieves I have used for the last eight years, and which I have found to answer every purpose. I know many gas works are at great expense for those articles; nearly all the common metals have been tried, but all have been found wanting.

I make them entirely of wood and without one nail of any kind of metal; the frame, dovetailed and fastened with wooden pins at its joints, is two inches square (any shape), the laths, forming the lime surface from $\frac{3}{16}$ to $\frac{1}{4}$ in. thick and $1\frac{1}{4}$ in. deep, made of any tough wood, are dovetailed at each end into the frame edgeways up; each lath is rounded nearly to a point on the upper or lime surface; the space between the laths is $\frac{3}{16}$ in.: where handles are necessary, they must be made of wrought iron to go entirely through the frame, and to screw underneath; this facilitates their removal when required. One set of sieves with me has worn out three sets of handles $\frac{3}{8}$ in. thick.

Many will object to this arrangement; they will think the frame clumsy, and as losing so much purifying surface; but this, I think, is not the case, as when the lime is turned off the sieve, that part that has covered the frame and laths will not be so much discoloured by tar, but will be found to have been equally effective, the gas having an equal affinity for the whole of the lime introduced.

Seaham Harbour, Durham, Oct. 28, 1850. H. W. Smith.

THE GILLARD LIGHT.

Sir,—Mr. J. W. Hodgetts has twice spoken in your Journal of M. Gillard's gas, and has as often endeavoured to throw somewhat of discredit upon it. It would appear from the combination of the two articles that he wished to praise the hydrogen gas of White to the detriment of that of Gillard. Is it true that Mr. Hodgetts has an interest in praising the resin and water gas? That is, however, not the question; but as Mr. Hodgetts has twice communicated to the public his impressions respecting the platinum gas, will you permit me once only to give mine, which are not exactly in accordance with his?

But before doing so, it is requisite that I should correct some errors which he has, I believe, unintentionally committed. He states that two fires are requisite, one for the retorts, and the other for the boiler; that is the case at Mr. Kurtz's works, he using the waste steam from his engine boiler; but in other works the boiler is placed above the retorts; this is part of the patent, and, if he had made enquiries, he would have found likewise that the lime is reburnt by the excess of heat from the retorts, so that the expense is but trifling. In opposition to his statement, as to the illuminating power of the light, I beg to add that, in an experiment made by a well-known engineer, a burner, consuming $6\frac{1}{2}$ feet per hour, gave a light equal to $10\frac{1}{2}$ of Price's composite candles burning 132 grains per hour.

He likewise states that one-third of the gas made is to be deducted, leading one to suppose that it has to be taken off the 400 feet produced from $7\frac{1}{2}$ lbs. charcoal; but the truth is the 400 feet is the quantity delivered into the gasholder, after having passed through the purifier. Mr. Hodgetts states everything that he thinks may be to the disadvantage, and leaves out all that he thinks favourable to M. Gillard's gas; he mentions nothing about its being produced three times as fast as coal gas, so that one-third less retorts are required to make the same quantity; nor of the various ways in which retorts can be heated, so that the gas can be made for almost nothing, or of the great boon it will confer on Ireland, in providing a market for her carbonized peat.

My opinion of the gas coincides with that which has been so long entertained by all persons who have given the subject any attention, viz., that if we can find the means of rendering hydrogen gas luminous, without great expense, inconvenience, or annoyance in its combustion, it would be one of the greatest benefits that could be conferred upon society; and in adapting a platinum gauze cage or burner to the action of the gas, Mr. Gillard has obtained that which has so long been desired, as the following extract from the report of the Prefect of Police of Paris, dated the 1st of October, 1849, will show:—

"All questions relating to the public health, and which are to be reported upon by the Conseil de Salubrité, have been laid before that board; they have been discussed, and the following is an extract of their report which we hereby affirm.

"That the light yielded by this hydrogen gas gives place to no other, and it is remarkable for its whiteness and its intensity.

"That the employment of this gas renders useless the construction of chimneys, which seem made in order to absorb $\frac{4}{5}$ths of the heat effected by the combustion of coal or wood.

"That the price of manufacture is considerably less than any gas in use at the present day, and will, therefore, effect great economy in lighting and heating.

"That the gas has no smell, either burning or free.

"That it contains no sulphur, carbon, or arsenic.

"It can be burnt in all places without inconvenience.

"It produces no smoke or mephitic gas."

Such are the results found by the sanitary commission in Paris. From the experiments I have seen, it appears exceedingly easy for a common workman, taken by chance out of a gas work, to make it alone the second day.

London, Nov. 1, 1850. G. Warriner.

THE GREAT CENTRAL GAS COMPANY.

Sir,—Will you permit me to inquire, through the medium of your Journal, the condition of this company in two particulars which disconcert me greatly as a shareholder. Is it true that we have contracts with 6000 consumers? If so; why do we not supply them? I have been told that our loss by leakage prevents the supply; do you believe this? It is quite contrary to the evidence of our engineer before the Houses of Parliament.

I presume we are making 500,000 cubic feet of gas per diem, and if so, what becomes of it? for I fancy we are not supplying more than 200,000 cubic feet. I would suggest to our directors to examine the meter at the gasholder by which we pay, and also the consumers' meters, by which we are to receive, and see what the difference may be, as that must give the loss by leakage.

November 6th, 1850. A Shareholder.

[If the writer of the above had referred to our last number, it would have saved him the necessity of making inquiry on the subject. We have no inclination to brave the Cerberus who guards the entrance to the scene of the mysteries now being enacted at Bow-common, and must, therefore, content ourselves with stating upon what appears to us to be satisfactory authority. that eight benches of the much-talked of combined clay and iron retorts are now at work, each of which benches *ought* to produce, according to one engineer who gave evidence in Parliament, 112,000 feet of gas per day; and according to the other, 140,000 feet. Taking it, however, at the smaller quantity, and multiplying by eight (the number of benches at work), there *ought* to be a production of 896,000 feet of gas per day. The *actual* make is, we believe, less than 500,000 feet, by far the larger portion of which is made by the clay retorts: the iron ones requiring double or treble the ordinary time for the carbonization of full charges. What proportion finds its way to the consumers' meters cannot of course be ascertained yet; but, even supposing the statement put forth to be correct, that 15,000 private lights are now being supplied from these works, we doubt whether the quantity of gas consumed by them will exceed 240,000 feet per day. Every one who followed the recent parliamentary proceedings will recollect the astonishment created by the assertions that "there was little leakage from gas mains;" that "the loss was principally due to stealage;" "the quantity lost did not bear one per cent. to the quantity passing through;" and other similar speculations, which it was then treason to doubt, but of which experience is indicating by degrees the true value.]

HISTORY OF THE GAS METER.

SIR,—On perusing the article on "The History of the Gas Meter" in your last number, I am at a loss to account for the reason why the writer of that article, with a full knowledge of the facts, omits to inform your readers to whom gas companies and the public are indebted for the dry meter in the improved state in which the writer admits it to have been when the patent was sold by myself to the Dry Meter Company. He is quite aware that I purchased the Bogardus Patent for a large sum, when, as he says, the meter was "a very rude piece of mechanism," and that it was at my further cost, during upwards of two years, aided by the ingenious Mr. George Patterson, the machinist and index maker, that it was so far perfected as to be sold by me to the Dry Meter Company.

The writer also refers to a further improvement made in the dry meter by Mr. Bogardus, which was patented by Mr. Sullivan (of the United States); *that patent I also purchased*, and am at the present time the proprietor of. The meter last referred to (viz., Sullivan's) is identical (in the movements connected with opening and shutting the valves, and as having two diaphragms) with that since manufactured by Mr. Croll, under (as I suppose) the mistaken idea that by a trifling variation in the arrangements, the similarity would not be discovered.

Requesting you will give this explanation prominent insertion in your forthcoming number. THOMAS EDGE.

Wet and Dry Gas Meter Works, Westminster,
Nov. 2, 1850.

[The writer of the above having given his name and address, takes upon himself all the responsibility of his assertions; but it appears to us unaccountable that no attempt should have been made to stop the continued infringement of what he conceives to be his rights.]

Register of New Patents.

HORATIO CARTER, of Thirza-place, Old Kent-road, Surrey, gentleman, for "*certain improvements in the production of light from ordinary coal gas by the use of burners consisting of more than one ring or sheet of flame combined with a suitable chimney or chimneys, and supplied with atmospheric air, particularly adapted to ventilation.*" Patent dated March 23, 1850.

[We had purposed giving this specification with the accompanying drawings; but have not been able to get them engraved in time for this month's Journal.]

ALFRED VINCENT NEWTON, of Chancery-lane, in the county of Middlesex, "*for improvements in coupling joints for pipes.*" Patent dated March 26, 1850. (Communication.)

This invention of improvements in coupling has for its object to obviate the necessity of running lead into the sockets in joining pipes, and the subsequent operation of caulking, to render such joints tight. The junction of pipes, according to this invention, is effected by the compression of a soft metal, or other material, round the ends of the pipes to be united, by means of a collar, by which the soft metal is enveloped, and which collar is used for the compression of the soft metal round the abutting ends of the pipes to be united.

The annexed cut represents, in section, pipes connected according

Fig. 1.

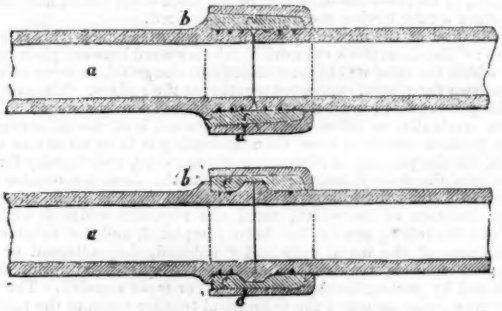


Fig. 2.

to this improvement. The ends of the pipes, *a*, *a*, have grooves or projections formed on their exterior, and one end of the pipe is furnished with a shoulder, *b*. A belt or hoop, *c*, *c*, of some soft metal, such as lead, is placed on the junction of the pipes; the exterior of this hoop is of a conical form, adapted to that of the interior of the hard metal, collar, *d*. This collar is furnished with an internal flange, which retains the soft metal within the collar during the compression of the metal; the opposing force is offered by the shoulder, *b*, which prevents the soft metal, *c*, *c*, escaping from the interior of the collar. By exerting sufficient force on the collar, *d*, in the direction of the shoulder, *b*, the conical forms of the collar, and soft metal lining that material, will be compressed round the pipes, and into the grooves formed thereon, and will thereby render the junction of the two complete, and perfectly tight. Instead of casting the shoulder, *b*, permanently on one end of the pipe, a loose collar may be substituted, and suitably held during the process of compression, to effect a like object. This loose collar may be applied to the formation of the successive joints required. When the soft metal or other material, *c*, *c*, is of a soft and plastic nature, the conical form of the ring or hoop, *d*, may be dispensed with, as the endways compression will be found sufficient to effect the desired object. Where greater security of the joint is required, the patentee forms the ends of the pipes with small flanges, as exemplified in fig. 2, the soft metal collapsing on and surrounding the flanges,—the lengths of the pipes are held more securely together. The principal features of the improvement are described as being the simplicity and cheapness of construction, which render these joints very economical.

Secondly.—The rapidity with which such joints can be made, the inconvenience of melting lead, and afterwards caulking, to make it tight, being avoided. The ease with which the joint may be renewed; affording great facilities for repairing or renewing intermediate lengths of pipes; and the mode of making the joint, rendering it available where the junction has to be effected under water.

The patentee claims, as the invention communicated to him:—

Constructing coupling joints or connections, by surrounding the abutting ends of pipes with a collar, or tube of lead, or other soft metal, or suitable material, so as to form a covering at the point of junction of the two pipes, and forcing over such belt of lead a collar or covering of some unyielding material of the necessary strength, whereby the yielding material will be compressed in the space between the ends of the pipes and the outside pipe or collar, producing the joint required.

RICHARD PROSSER, of Birmingham, civil engineer, for "*certain improvements in machinery and apparatus for manufacturing metal tubes, which improvements in machinery are in part applicable for other purposes where pressure is required; also for improvements in the mode of applying metal tubes in steam boilers, or other vessels requiring metal tubes to be applied within them.*" Patent dated April 11, 1850.

The improvements described in this specification consist:—

1. Of apparatus applicable for the purpose of planing and preparing the edges of flat metal plates, which are afterwards to be formed into tubes or pipes.

2. Of a means of bending and turning up the flat metal plates to the form of cylindrical tubes or pipes.

3. Of preparing machinery for actuating and working the bending or turning machinery, for bending the plates.

4. Of a means of securing metal tubes into plates of steam boilers or other vessels.

The improvements described under the first of these heads consist in certain additions to planing machinery, for planing and cutting the edges of flat metal plates, preparatory to their being formed into cylindrical tubes or pipes, which formed the subject matter of the specification of a former patent granted to the present patentee. In the planing machinery there described, the flat metal plates—the edges of which have to be planed and prepared—were placed upon the horizontal traversing table of the planing machine, and properly secured thereon, the edges of the plates slightly overhanging or projecting beyond the sides of the table—and in this position the edges were planed, and cut by fixed and stationary cutting tools—the table and plate traversing beneath the cutters. The present improvement consists in placing and securing the plates to be planed upon the traversing table upon their edges in vertical positions—the table being arranged and constructed in a manner suitable for their reception in that position. The plates are placed upon the table in two rows parallel with each other, one row upon each side of the machine, and secured by one long wedge, acting upon block pieces, pressing against the sides of the plates. The uppermost of the edges of the plates, upon the table being planed by the compound cutting tools of the machine, are then reversed in their positions upon the table, and their other edges planed and prepared.

The next improvement under this head is the application to the planing machine of compound cutting tools for planing and preparing the edges of the metal plates upon the traversing table; each of these consists of a number of cutters or tools placed in a row, one behind the other, and secured by set and adjusting screws to a frame or holder. The separate cutters or tools of each compound tool are so arranged and placed, that each one cuts deeper than the one immediately preceding it, so that when in operation each of them plane or cut off from the edge of the plate its own separate and distinct shaving of metal, and thereby reduce the edge of the plate to the desired state. These separate cutters are adjustable so as to allow for the unequalness of the sharpening process. In some cases the patentee proposes to apply to each compound cutting tool two rows of separate cutters, so arranged that their edges are turned in opposite directions, that is, one set or row of them plane or cut the edges of the plates during the traverse forward in one direction, and the other set or row operates upon the edges of the plates during the traverse in the backward direction. The other parts of the planing machine are those described in the specification of the former patent.

The improvements under the second part of the specification consist in a means of bending and turning up flat metal plates into the form of cylindrical tubes or pipes. This is also an improvement upon the mode of bending or turning up the plates described in the former specification. The means there described consist in bending up the plates by the employment of moulds or dies of different forms, by which the plates are bent up at three distinct operations, as many pairs of moulds being employed. The first of these operations consist in submitting the flat plates to the action of a pair of moulds, by which the flat plates will assume a trough or gutter-like form; this is the first stage. At the next operation, or second stage, the plates assume a form nearly approaching to the cylindrical form; and at the third or last stage of bending, the plates assume the perfect form of a cylinder, but each of these operations are conducted separately and distinctly. The present improvements consist in so arranging and constructing the machinery, and placing the moulds or dies one above the other, that the three operations are conducted simultaneously, and at one rise of the pressing machinery.

The improvements described under the third head consist in the

machinery and apparatus for effecting the pressing operations. Steam pressure is employed for this purpose, but it operates through the medium of hydrostatic or hydro-mechanical apparatus, as follows:—A large steam cylinder is provided with a piston, to the rod of which is attached the plunger or piston of a hydrostatic cylinder. From this cylinder a pipe communicates with the hydrostatic cylinder of the pressing apparatus, the ram or plunger of which is attached to the moulds for bending the plates. At one stroke of the steam piston, the piston or plunger of the hydrostatic cylinder attached to it forces a quantity of water from that cylinder and injects it into the cylinder attached to the pressing apparatus. This quantity is just sufficient to produce the closing of the moulds, and effect the bending of the plates. Upon the return stroke of the steam piston, and the consequent return of the piston or plunger of the hydrostatic cylinders to their former positions, the water previously injected into the hydrostatic cylinder of the pressing apparatus will return back from that cylinder to the hydrostatic cylinder attached to the steam cylinder, and thereby allow the ram or plunger in it to descend and open the pressing moulds, and allow the bent plates to be removed; this return of the water through the pipe of communication takes place because there are no valves or cocks in that pipe to prevent it.

The improvement described under the fourth part consists in an improved mode of securing tubes into the plates of steam-boilers and other vessels.

The patentee having illustrated and described his improvements with the utmost minutiæ, then proceeds to state his claims, which are as follows:—

First—With respect to the manufacture of tubes, the mode described in planing the edges of flat metal plates or skelps straight and regular, which are afterwards to be turned or bent up, and formed into tubes or pipes, and which consists in the application, to the moving or traversing table, of the planing machine employed for the purpose; of the means and apparatus described for holding two of the flat metal plates securely therein, the plates being placed in edgeways upwards, and the relative positions being parallel vertical planes, together with the manner of combining these parts of the apparatus, and employing them for the purpose of securely holding the plates upon the traversing table. The application to the planing machine employed for planing the edges of metal plates, and the employment therewith of compound cutting tools, which consist of a number of distinct cutting tools or edges, placed one behind the other, and operating at the same and at different places lengthways upon the edges of the plates to be planed, so as to concur together in cutting and planing away the superfluous metal from the edges of the plates, to produce a straight and equal edge, by a succession of these cuttings or shavings, produced by the cutting tools or edges of each compound cutting tool, the compound cutting tools being distinguished from other cutting tools for the like purpose; in the manner of making, combining, and adjusting them, so that each cutting tool or edge is held fast in the frame or holder; the same is capable of adjustment when the breakage or resharpening of the tool renders it necessary, so as to cause its cutting edge to be in its proper relative position to the other cutting edges or tools of the same compound cutting tool, when it must be fixed to the frame or holder. The application to the planing machine for planing the edges of flat metal plates of two rows or series of cutting edges or tools in each compound cutting tool, the cutting edges of which are placed and adjusted in reversed positions, one row or series of cutting edges being intended for cutting or planing the edges of the flat metal plates in one direction, and the other row or set of cutting edges for cutting the edge of the metal plate in the other or opposite direction of the moveable or traversing table.

Under the second part of the specification, which relates to the bending or turning up of the flat metal plates into the form of tubes or pipes, the patentee claims:—

The method described of bending or turning up flat metal plates into the cylindrical form of tubes or pipes, which consists of a long moveable bar, placed in or between the dies, or parts of the mould in which the flat plate is to be bent or turned, for the purpose of supporting and retaining the flat metal plate within the mould wherein the plate is to be bent to the first stage or form, which is of a gutter form, as described. The moveable side pieces, or bars applied to the sides of the mould, wherein the first stage or form of bending the plate is effected, for the purpose of more effectually and completely bending up the two marginal portions, or edges of the plate, to the required curvature at the first stage or form of bending up the plate. The arrangement and combination of the several moulds or tools employed for bending and turning up the metal plates, so as to constitute together a complete set or series of moulds, operating together and in conjunction, for performing all the three stages or forms of bending or turning up the metal plates at one time or action of the pressing machinery,—the several moulds or dies being arranged one above the other, as described. The forming the mould in which the third or last stage or form of bending or turning up the metal plates is performed, with a recessed groove in the hollowed part of such mould, for the purpose of turning up the feathered edges of metal plates, which are bent or turned up to form metal tubes or pipes, as described.

Under the third part of the specification, which relates to the pressing machinery employed for working and actuating the moulds or dies, by which the metal plates are bent or turned up to the form of cylindrical tubes or pipes, the claims are:—

The application of the power of steam for the purpose of working and actuating the hydrostatic or hydro-mechanical pressing machinery, for bending or turning up metal plates to the form of tubes or pipes, consisting of a piston, fitted and moving within a large steam cylinder, impelled by the pressure of steam, such motion being communicated to a piston or plunger, fitted into and moving within an hydrostatic cylinder, from which hydrostatic cylinder a free and uninterrupted communication with another hydrostatic cylinder, which is the hydrostatic cylinder of the pressing machinery,—the whole apparatus and machinery being so disposed and arranged, that upon one stroke of the steam piston within its cylinder, and one corresponding stroke of the piston or plunger within the hydrostatic cylinder, a quantity of water will be expelled from the hydrostatic cylinder, and injected into the hydrostatic cylinder of the pressing apparatus, sufficient to give the intended motion and effect to the plunger or ram of the hydrostatic cylinder of the pressing machinery, for working and actuating the moulds for bending and turning up the plates to the form of tubes or pipes. Upon the return of the stroke of the steam piston within the steam cylinder, and the return of the piston or plunger within the hydrostatic cylinder, the water previously injected into the hydrostatic cylinder of the pressing machinery will be allowed to return back to the first hydrostatic cylinder, and thus cause the ram or plunger of the hydrostatic cylinder of the pressing apparatus and its connected parts to descend, preparatory to another upward stroke of the apparatus, there being no valves or cocks in the pipes of communication through which the water passes. The application of the pressing machinery described for other purposes than the above, where pressure is required, as for pressing flat plates of metal into the hollows of metallic or other suitable moulds, and thereby bending such plates into the forms required other than tubes, as beading, &c. For compressing powders of earthy substances or clays, or other similar materials employed in the manufacture of earthenware into moulds for the purpose of manufacturing tiles, slates, bricks, and other articles composed of such materials; also for compressing or rivetting up the ends of metal pins, bolts, or rivets, for the purposes of rivetting together sheets or plates of metal, as boilers, &c.

Under the fourth part of the specification, which relates to a mode of applying or attaching metal tubes or pipes into steam boilers or other vessels requiring metal tubes or pipes fitted into them, the patentee claims:—

The method described of applying tubes or pipes consisting of a hoop or hoops of metal, fitting tight around the external end of the metal tube, and also such metal hoop or ring fitting tightly within a hole or aperture through the plate to which the tube is to be secured, and through which hole or aperture the tube to be secured passes, the hoop or ring being interposed between the exterior of the end of the tube and the interior of the hole or aperture in the plate, which is made taper or conical, to receive it, the outside of the hoop or ring being likewise taper or conical to fit the taper or conical hole, the hoop or ring fitting in close contact both surfaces. For this purpose the hoop is split or cut, or left open at one part of its circumference, and provided at that part with an interlaying piece or tongue of metal, fitted into both sides of the cut or opening, so that such joint permits a very slight contraction of the hoop to take place during the time of fixing the tube into the plate, and by such contraction of the hoop to cause it to grasp the end of the tube firmly, and secure it tightly.

Edme Augustin Chameroy, of Paris, "*for improvements in the manufacture of boilers, and of pipes, of malleable substances, as well as of elastic matter.*" Patent dated April 15th, 1850.

This specification describes several modes of manufacturing tubes from malleable materials.

The first of these is as follows:—A short thick tube or pipe, of the same interior diameter as the finished tube is to have, is first provided, but the patentee does not state how these are made, whether by casting, in the case of the metal being brass or copper, or by what means, in the case of malleable iron; the thickness of the metal is to be considerably greater than the thickness of the finished tube. The object of the patentee's improvements appear to be, to elongate the length, or increase the diameter, of the thick short tubes, and thereby produce a tube having the dimensions desired.

The first of the modes by which the patentee effects this is as follows:—The short thick cylindrical tube is passed between plain rollers, by which the tube will be compressed and elongated, forming now as it were two flat plates, connected together at their edges. The process of rolling is repeated until the thickness is sufficiently reduced. If the tube originally, or before the rolling process, is of the same diameter the finished tube is to have, then the rolling is to be all in one direction, for the purpose of elongating the material, and thereby forming the tube the desired length; but should the diameter require to be increased, then the rolling of the flattened tube is to be effected in the direction of its width, until the requisite width is obtained. When the rolling process has been completed, and the substance or thickness of the metal sufficiently reduced, the collapsed or compressed tube is required to assume the cylindrical form, this is effected by passing through it a conical or taper mandril. The metal has now again assumed the cylindrical tubular form, of the thickness of metal desired,—but upon the outside of it are two longitudinal ribs or projections, produced at the parts where the folding has taken place, and which are exactly opposite each other. When the tubes are applied to other purposes, as gas tubes, &c., these ribs may be rather a convenience and advantage than otherwise, and are therefore allowed to remain; but for other purposes, as the flue-tubes of steam boilers, it will be necessary to remove them, which may be done by any known means for cutting them off.

Another mode of elongating the short thick pipe or tube is described: this is effected by means of revolving conical rollers. The tube to be elongated is placed upon a long steel mandril, which fits the interior; it is then submitted to the action of four revolving conical rollers, which, as they revolve upon their own axes, also revolve around the axis of the mandril or tube operated upon. The brackets which carry the conical rollers are secured to the face of a revolving wheel, through the hollow centre of which the mandril and tube pass; thus, as the central wheel revolves, the conical rollers will be carried round, and, compressing the thick metal of the tube, will reduce its thickness, and elongate the tube, which is being gradually passed through, so that the conical rollers act upon the whole surface of the tube, from end to end.

Another mode of reducing and elongating the thick short tubes

described, is by means of two sliding bars, between which the tubes to be elongated are placed, and an alternating rectilinear motion is given to them, they are set, and also traverse at a slight angle to each other, their sides are inclined off upwards, so as to gradually operate upon the tubes submitted to them. The reciprocating movement is given to the sliding bars in opposite directions at the same time, by means of cranks, to which they are attached by connecting rods. The tubes, when placed between the sliding bars, are operated upon in a vertical position, and gradually pass downwards between the bars as the compression and elongation takes place, until the whole is acted upon.

The patentee claims:—

1. The manufacturing of tubes and pipes from hollow pieces or masses of malleable metal, by compressing and flattening them between plain rollers, so as to elongate or increase the width of such tubes or pipes as required.

2. The mode described of manufacturing tubes or pipes, or solid bolts or bars, by the machine described, by revolving conical rollers, revolving around the tubes or pipes, and thereby elongating them.

3. The mode described of manufacturing tubes, pipes, &c., by the apparatus shown and described,—being two sliding bars, to which a reciprocating rectilinear motion is given, the tube or pipe to be elongated and formed being placed between them.

The patentee states, by the machinery and means he employs, he manufactures tubes either hollow or solid.

Antoine Pauwels, of Paris, in the Republic of France, merchant, and Vincent Dubochet, also of Paris, in the Republic of France, merchant, for "*certain improvements in the production of coke, and of gas for illumination; and also for regulating the circulation of such gas.*" Patent dated April 23, 1850.

This specification relates to the manufacture of coke and the production of gas. The object of the patentees is to manufacture coke suitable for smelting metals and raising steam in locomotive engine boilers, and at the same time to produce gas fit for illumination. The improvements described consist:—

1. In a means of extracting carburetted hydrogen from coal, suitable for illumination, and producing coke of a superior quality.

2. In a means of regulating the pressure of gas in the oven and passages, so as to render the loss of it as little as practicable.

The apparatus described in the specification to be employed for the production of gas and coke consists:—

1. Of the coke oven and apparatus, or what the patentees term the pyrotechnic apparatus.

2. The extricating apparatus for extracting the carburetted gas from the oven, and regulating the pressure of the gas within the oven and passages.

3. The moderator or regulating apparatus, for regulating and determining the pressure of the gas in the apparatus.

The first of these, namely, the pyrotechnic apparatus, is illustrated in the accompanying engraving, fig. 1, which represents the oven and its connected apparatus in transverse section. A, A, the masonry of the oven; B, the oven, for the reception of the coals to be operated upon, the horizontal form of which is represented in the drawings accompanying the specification as being oval or elliptic; but other forms may be adopted as desired, the patentees not confining themselves to any of the exact forms or details shown or described. C, C, the doors or openings of the oven, of which there are two placed on opposite sides, by which the coals are inserted, and the coke produced extracted; these are closed by fire bricks or lumps, suspended from a chain, and balanced, and, when closed, are pressed and forced up by a screw, C^1, C^1, so as to effectually close the doors or openings in an air-tight manner; D, the floor of the oven, beneath which are the small furnaces, E, E, the floors of which traverse beneath the floor of the oven, which thereby becomes heated; E^1, E^1, are heat chambers, built in the upper part above the dome of the oven, for the purpose of acting as a reservoir of heat, to heat the oven and operate upon the coal when a fresh charge is introduced into the oven. From the centre of the dome of the oven rises the draft chimney, F, which is formed of an iron cylinder, lined with fire bricks. This is surmounted by the cylinder or vessel, G, into which the gas evolved from the coking process of the coal is received. Pipes, G^1, G^1, communicate between this receiving vessel and the vertical pipes, H, H, the upper ends of which are formed as hydraulic valves, H^1, H^1. The lower ends of the vertical pipes, H, H, terminate in horizontal pipes, which communicate with the extracting apparatus. The hydraulic valves, H^1, H^1, are capable of closing the communication at any time, between the interior of the oven and the extracting apparatus, and thereby prevent the passage of the gas from the one to the other as required. The top of the cylinder or receiver, G, is closed by a moveable plate or stopper, or by a moveable bent or elbow pipe. By the employment of the latter, the gaseous products from the coking operation going on in the oven are allowed to flow into the horizontal flue, I, and are thence conducted downwards into the flues beneath the floor D, of the oven, by the downward passage shown in dotted lines at I^1, and past the register K. The weight of the hydraulic valves, H^1, are counterbalanced by the balance weights, H^2, H^2, respectively, in such manner, that by lifting the balance weights, the valves will descend into the water in the case, and thereby shut off the communication between the pipes, G^1, G^1, and H, H,—the water resulting from the condensation of any vapour in the pipes, G^1, G^1, may flow into the cases of the hydraulic valves, H^1, H^1, which will thus always contain a sufficient quantity of water. The mode of operation is as follows:—The oven is supposed to have been previously in operation, therefore three fires are in the small furnaces, E, E, and a store of heat is in the heat chambers or reservoirs, E^1, E^1; the recent charge of coke has been withdrawn, and a fresh supply of coal is now thrown into the oven by the doors, C, C, which are then closed, and secured by the screws, C^1, C^1, in an air-tight manner. The hydraulic valves, H^1, H^1, are closed, and the top of the receiving vessel or cylinder, G, is opened by the moveable plate or stopper being removed. The heat of the oven from the small furnaces, E, E, and flues beneath the floor, and from the heat reservoirs, E^1, E^1, is quite sufficient to commence the coking process of the charge of coal, so soon as it is in, and the doors closed. The top of the receiver or cylinder, G, is left open for a short time, for the purpose of allowing the escape of the aqueous vapours from the coals during the first stage of the operation. As soon as the carburetted gas begins to be evolved, the top of the receiver, G, is closed by the moveable plate, and the hydraulic valves,

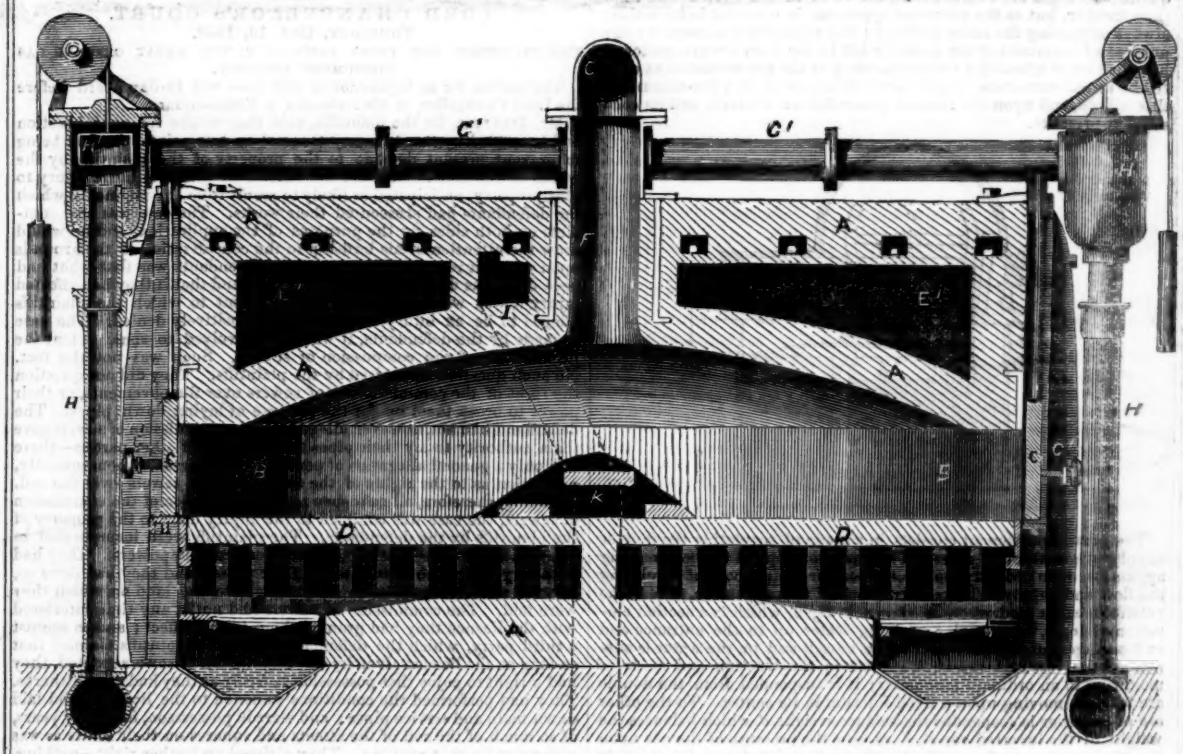
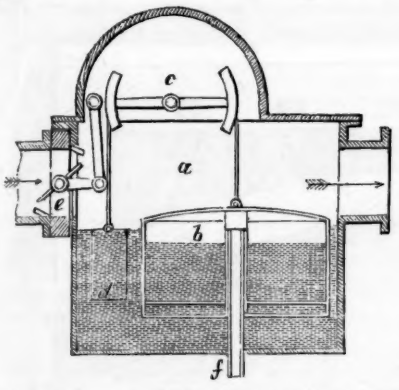


Fig. 1.

H^1, H^1, are opened, by which the communication will be opened between the pipes, G^1, G^1, and the pipes, H, H, and consequently between the oven, B, and the extracting apparatus, the construction of which will be hereafter described. The process of coking now goes on; the carburetted gas is extracted, and withdrawn from the oven by the extracting apparatus, as it is evolved from the coal; and when this gas ceases to be generated, the hydraulic valves are closed, and the elbow or bent pipe is applied to the top of the receiver, G, in place of the plate, which is now removed to make room for it, and the operation proceeds. The gas now generated is non-carburetted gas, and not being able to pass off to the extractor apparatus, on account of the closing of the hydraulic valves, it passes through the bent or elbow pipe, applied to the top of the receiver, G, and thence into the horizontal flue, I, and downward to the flues beneath the floor of the oven, where it becomes combined with a quantity of atmospheric air, which is here admitted for the purpose; combustion of the gaseous matter ensues, and assists in the heating of the oven. This continues for a short time, until the evolution of gas ceases, when the coking process is complete. The doors, C, C, are now to be opened, to admit atmospheric air, and cool the coke down to a state when it can be withdrawn from the oven,—which done, the apparatus will be ready for another charge of coal. Several of these ovens and apparatus may be arranged and constructed, connected together, so as to be worked in succession, and the extractor apparatus will then be continuously in action.

The extractor apparatus, the working of which constitutes the next part of the process, is as follows:—Three vessels, similar to small gasometers are placed in inverted positions within so many vessels of water, precisely in the same manner that gasometers are mounted. These are provided with suitable means for maintaining them in a vertical position during their traversing. A horizontal shaft is fixed through near the top of each vessel, the ends projecting beyond the sides have connecting rods attached to them, the lower ends being attached to cranks upon a horizontal shaft, passing under the whole of the extractor vessels. Rotary motion is given to the horizontal shaft by means of spur gearing from a steam engine or other convenient first mover, and thus an ascending and descending movement is given to the extractor vessels, which thereby act as exhausters or extractors. There are pipes of communication between the interior of the extractors and the ovens, as before explained, through which, at each aspiration or stroke of the extractors, the carburetted gas is withdrawn from the oven. Connected with the extractors is a regulator, which consists of a vessel inverted within another vessel containing water, precisely similar to an ordinary gasometer. Into this regulator the gas passes from the extractors. The regulator is balanced by a weight, and thus determines the pressure of the gas. The regulating apparatus attached to the extractor apparatus is of such a nature that it operates so as to constantly maintain the same pressure of the gas in the oven, and in the passages from it to the extractor apparatus. During the operation of coking, considerably larger quantities of gas are evolved from the coals in the oven at one time than another, but as the extractor apparatus is constant in its action, always extracting the same quantity; the regulator apparatus for the purpose of maintaining the quantity left in the oven always uniform, has a means of allowing a certain quantity of the gas extracted at each stroke of the extractors to be returned to the oven, and the amount of this will depend upon the amount generated or evolved, and its consequent pressure.



The next improvement consists in a mode of regulating the flow or supply of gas through pipes. This may be supplied to the foregoing apparatus, or to ordinary mains or pipes, for the purpose of regulating the flow and supply. The construction of this apparatus, which the patentees call a moderator, is shown in fig. 2, which is a section elevation of it; *a*, is a vessel containing water up to the entrance and exit passages for the gas; within the vessel, and in the water is suspended the inverted vessel, *b*, similar in construction and mode of mounting to an ordinary gasometer; it is suspended from the double arc lever, *c*, moving upon a fixed fulcrum in its centre. To the other arc of the lever is suspended the balance weight, *d*, which balances the weight of the inverted vessel, *b*, as also the pressure of the gas upon its whole upper surface. To the lever is jointed a rod, which is attached to a lever upon the axis carrying the valve or plate, *e*, the action of which is precisely that of the ordinary throttle valve of a steam engine. The interior of the vessel, *b*, above the water, communicates with the external atmosphere by means of a small pipe, *f*, passing through the bottom of the vessel, *a*; so that whatever the position of the vessel, *b*, in the water of the vessel, *a*, the pressure of the air within it will be always that of the external atmosphere; *g*, the pipe admitting the gas, and *h*, the pipe emitting it; the current of the gas follows the direction of the arrows. The mode of operation is thus:—Suppose the pressure of the gas is increased, it will exert a greater pressure upon the top of the vessel, *b;* and as the interior of it is open to the atmosphere, and therefore the pressure of it constant, or nearly so, it follows that the vessel, *b*, will sink; the opposite end of the arc lever, *c*, will be raised, and consequently the throttle valve, *e*, will be closed, and less gas will be allowed to pass it until the proper and regulated pressure is again obtained. The reverse of this is the case when the quantity of gas is diminished, and the pressure consequently reduced, when the vessel, *b*, will rise, and the throttle valve will be opened to a greater extent. The amount of the weight, *d*, may be regulated and adjusted at pleasure, suited to the pressure which it may be desirable to fix the gas at. There are several modifications of the moderator shown and described in the specification, but the arrangement and construction are analogous in all.

The patentees claim:—

1st. The arrangement and construction of the pyrotechnic apparatus, provided with one or more fireplaces or furnaces, and a caloric or heat reservoir or chamber. The arrangement of flues beneath the floor of the oven, for circulating and distributing the heat, for the purpose of producing from pit coal carburetted hydrogen, suitable for the purpose of illumination. Also for the production of coke, suitable for smelting metals, and generating steam in locomotive steam boilers.

2nd. The application to the above-described pyrotechnic apparatus, and the employment in combination with it of the extractor apparatus, for the purpose of extracting and withdrawing the gases evolved from the oven, and regulating the pressure of them in the oven and passages.

3rd. The arrangement and construction of the several modifications and forms of regulating and moderating apparatus, and their employment for regulating the flow and distribution of gases, as described.

[We are under the necessityiof postponing till next month the specifications of the under-mentioned patents, which are of great length]:—

Richard Laming, of the new chemical works, Isle of Dogs, Middlesex, chemist, and Frederick John Evans, of the Horseferry-road, Westminster, gas engineer, for "*improvements in the manufacture of gas for illumination and other purposes to which coal gas is applicable, in preparing materials to be employed in such manufacture, and in apparatus for manufacturing and using gas; also improvements in treating certain products resulting from the distillation of coal; parts of which above mentioned improvements are applicable to other similar purposes.*" Patent dated April 23, 1850.

George Michiels, of London, gentleman, for "*improvements in treating coal, and in the manufacture of gas, and also in apparatus for burning gas.*" (A communication.) Patent dated April 30, 1850.

Legal Intelligence.

LORD CHANCELLOR'S COURT.

THURSDAY, OCT. 10, 1850.

THE CHARTERED GAS LIGHT COMPANY *v.* THE GREAT CENTRAL GAS CONSUMERS' COMPANY.

The motion for an injunction in this case was to-day heard before the Lord Chancellor, at his residence in Eaton-square.

Mr. Daniell, for the plaintiffs, said that notice for an injunction had been filed by the Attorney-General on two points, the first being to prevent present damage to the property of the plaintiffs by the works of the defendants, and the second to prevent future injury to that property, anticipated as likely to result from the manner in which the defendants had prosecuted their works. The case was now complete on both sides for the purposes of the application, and he would draw the attention of his lordship to the consideration of the grounds upon which it rested. The case of the defendants was that what had been done was done as a matter of right; and that if they had effected injury it was without damage. The extent to which the plaintiffs alleged to be an injury the defendants positively denied. The case as made by the defendants, it was said, involved to some extent the jurisdiction of the commission of sewers. Such was not the fact. No such question was raised by the plaintiffs. They did not question the right of the commissioners of sewers over the pavements, or their power to break them up for the purpose of laying down pipes. The defendants had not, however, alleged that the commission of sewers gave them authority to lay their pipes to the injury of other parties—there was only a general allegation of permission. It was not, consequently, a question as to the rights of the commission of sewers over the soil. Avoiding, therefore, all reference to the jurisdiction of the commission of sewers, the case was confined to the injury done to the property of the plaintiffs by the defendants. The plaintiffs were incorporated in 1810, and acts subsequently passed described their powers. They had authority under the statute to lay their pipes; and they had done so, as well as taken possession of the right to the land on which they were laid. The commission of sewers had not at any time interfered with the licence they had granted them to that effect; and as against a third party, which the defendants were, the plaintiffs claimed that so long as the licence given by the commission of sewers existed, they had a right to enjoy that possession as freely as they had done hitherto. They had performed the conditions annexed to the licence; had laid down main and service pipes; and were in possessson, for thirty years, of so much of the soil of the streets and squares on their limits as was necessary for that purpose. They claimed no further right—nothing, in fact, beyond continuance in that peaceable possession and enjoyment. They did not desire to be interfered with injuriously by other pipes, and they did not desire to interfere with other pipes themselves. The application in question had nothing whatever to do with the competition of rival companies; it was confined solely to the right of property. The public, too, were interested in the protection claimed by the plaintiffs, for the plaintiffs had contracted to light the streets

until next Midsummer, under heavy penalties, which could not be done if they were interfered with in an injurious manner. In the beginning of 1849 a new company was promoted to supply the City with gas, by a gentleman who had left the service of the plaintiffs in 1845 under circumstances stated in the affadavit. In the same year an application was made to Parliament for an act, but it failed. The defendants said it failed on a point of form: the plaintiffs on a point of substance. The cause of failure was not material. In 1850 the application was renewed, and it was opposed by the plaintiffs in conjunction with another gas company in the City. The bill passed the House of Commons, but it had various clauses added to it, protective of the rights and interests of the plaintiffs. In the House of Lords the matter underwent investigation.

Mr. M. D. Hill said the affidavit had been mis-stated. The clauses were not added for the protection of the plaintiffs.

Mr. Daniell.—The Bill failed in the House of Lords. Pending the proceedings in Parliament, the promoters of the company having secured the consent of the commission of sewers to open the pavements, proceeded to lay down pipes, and thereafter the bill seemed to them of secondary importance. As far as the public was concerned the desideratum was secured—namely, a reduction in the price of gas from 6s. to 4s. per 1000 feet. The defendants had induced parties to contract with them for gas at 4s. for five years; and it was most material to them, therefore, to complete laying down their mains and service pipes in the chief streets of the City by the 29th of September. Great expedition was consequently made in July and August, and the profitable parts of the City were hurried to a completion. The defendants, however, professed throughout a desire to execute their works in such a manner as to inflict no injury upon the property of the plaintiffs; and, covered as the streets of London are with gas and water pipes, great circumspection was necessary in introducing new pipes so as to produce no injury to those already laid down. Great care and skill were requisite in laying down new pipes, inasmuch as the old pipes were naturally laid in the best position for supply; and new companies were necessarily compelled to be content with an inferior position as regarded that advantage. The old companies being in lawful possession, should not be disturbed in their enjoyment of that possession. The defendants proceeded to lay their pipes; slight injuries of course were inevitable, and were not therefore made a ground of complaint, on the defendants giving an assurance that they should be attended to and repaired. The defendants made it a complaint that the plaintiffs would not suffer them to make the repairs of these injuries; but it was the invariable practice for each gas company to repair its own pipes, and there was good reason for so doing. For a considerable period these injuries were repaired; but as the 29th September approached, the defendants, in their anxiety to complete their work, proceeded more rapidly, and inflicted greater injury upon the property of the plaintiffs, until that property was placed in a position of imminent danger. On the 20th August a letter was written by the secretary of the plaintiffs to the solicitor of the defendants, complaining of that injury—viz., crossing their mains, and interfering with their service pipes; but as the solicitor was out of town there was no answer returned until the 27th August, when it was stated the complaint should receive due attention. On the 29th August the secretary to defendants wrote to the secretary of plaintiffs stating that it was not the wish of the company to injure the mains or service pipes of the plaintiffs; that the directors had given instructions to the contractors to that effect, and that they had reason to believe they were attended to. This was replied to by the secretary of the plaintiffs on the 30th of August, and a report of several cases of injury enclosed. No notice was taken of this letter, and nothing was done by the defendants to remedy or prevent the injuries complained of. The works were continued, and thereupon the present bill was filed on the 14th of September. So late as the 29th of August the plaintiffs had no reason to suppose the defendants would not control their workmen so as to avoid all serious injury to their property, and knowing, moreover, that the defendants were a competing company, the plaintiffs were unwilling to resort to litigation; but the report and the application being disregarded, and the infliction of injury continued, they had no alternative but to apply for an injunction. This they had done without any unnecessary delay, and the interval between the 29th August and 14th September was only sufficient to prepare the case for this application. The allegations on which plaintiffs rested were threefold—first, that the defendants had laid their mains upon the mains and service-pipes of the plaintiffs, "iron to iron," thereby injuring them presently and prospectively; second, that they had laid their mains and service pipes across the mains and service pipes of the plaintiffs, "iron to iron," to their detriment and injury; thirdly, that they had laid their mains and service pipes sometimes on the top of the mains and service pipes of the plaintiffs, sometimes across them, sometimes beside them, so close in all cases that the plaintiffs could not get at them, or to the houses which they served. There were other cases in which the plaintiffs were hindered from access to their pipes to repair them by reason of the proximity of the defendants' pipes, but the application for an injunction was laid on the three grounds just alleged. The nature of the injury complained of was impossible to define; it was at once present, and prospective, and contingent. Since the bill had been filed numerous cases had occurred involving those injuries that had been anticipated by the plaintiffs, and more were daily—nay, hourly occurring. In fact it had become absolutely necessary that the workmen and gas fitters of the plaintiffs should be at work day and night to obviate the terrible evils that were likely to result from the existing state of things, because, if an explosion or combustion should occur, the catastrophe would be so complete as to prevent all possibility of ascertaining how it occurred. The learned gentleman then read the affidavits of the secretary, the engineer in chief, and the inspectors of the plaintiffs, which were to the effect stated in his address.

Mr. M. D. Hill said that the defendants gave a direct contradiction to most of the specific instances adduced in the affidavits. Some 40 or 50 issues of fact were thus raised in the case.

Mr. Daniell said the positive denial of the defendants applied to only 20 instances out of upwards of 100. There were 86 uncontradicted. On these he asked for the injunction.

A long conversation then ensued, on the subject of the jurisdiction of the court in the case, between the Chancellor, Mr. Daniell, Mr. M. D. Hill, Mr. Walpole, and Mr. Rogers (the three latter for the defendants), which ended in Mr. Daniell's proposing, as a means of getting out of the difficulty admitted to exist on all hands in the way of an equitable decision, that an engineer, unconnected with either party, should be appointed to examine into the alleged instances of injury, taking the affidavits on both sides, and report on them, without giving any opinion.

The Chancellor asked what instances there were of such a course being taken? To report on the tendency to irremediable mischief, within a certain time, for example, was a matter of opinion and judgment. It was extremely difficult to ascertain how the legal rights of parties should be impugned. In the case of a right to action for damages, "tendency" would not do.

Mr. M. D. Hill: There should be a legal injury.

Mr. Walpole said, the Court of Chancery had been in the habit of directing an issue to ascertain whether certain acts "were or would be of damage and injury."

The Chancellor said, this referred to the case of the Glamorganshire Canal Company; but there an actual injury had been done. In the case before him no actual injury had been done.

Mr. M. D. Hill suggested that a remedy might be obtained by mandamus.

The Chancellor: To do what?

Mr. Hill: To place the defendant's pipes in a position not to do any injury to the plaintiffs'.

The Chancellor thought it would be extremely difficult to frame a mandamus sufficiently precise to effect that purpose.

Mr. Hill said the law of mandamus had been very much developed since his lordship left the Court of Queen's Bench, especially in railway cases.

A further conversation ensued in which the idea of a mandamus was abandoned.

The Chancellor inquired what was the state of the defendants' works?

Mr. Rogers said they had laid down 70 miles of main, and had 7000 lights contracted for. All the mains were down.

Mr. Hill said their works were completed in one sense and not in another. They had laid down all their mains.

Mr. Daniell said that 175 streets were yet unsupplied.

Mr. Rogers said there were applications for about 10,000 lights.

Mr. Walpole said the main and service pipes were completed with a few trifling exceptions.

Mr. Daniell admitted that the main bulk of the work was done.

The Chancellor said the question was, had any injury been done in the course of construction, which was not an injury to the permanent state of things. The plaintiffs were in possession of a statutable right. The defendants should be looked upon as an individual.

Mr. Hill said the plaintiffs had hardly a statutable right, if anything turned on that point. The right over the soil was vested in the commissioners of sewers; and the source of right was their permission. This permission. however, the defendants also had.

The Chancellor: Not exactly. The plaintiffs have legal authority to possess themselves of the easement.

Mr. Hill: With the permission of the court of sewers.

The Chancellor: That does not matter. They have a legal right; and they have possessed it for thirty years.

Mr. Hill said that great care had been taken to prevent a right from growing up. There was even a saving clause in the plaintiffs' act.

The Chancellor: To prevent monopoly.

Mr. Daniell repeated his offer—to empower an engineer to report.

Mr. Hill said he could not consent to give any engineer much power over seventy miles of main.

The Chancellor said there were two branches of the inquiry—1st, whether there was any right in law interfered with; and second, whether there was a case for equitable interference. A state of things that would involve a multitude of actions might entitle him to exercise an equitable jurisdiction in the matter; but it was clear that whatever was done would be only collateral to ascertain the legal rights of the parties. The question was, whether there was jurisdiction for a court of equity in the case.

Mr. Walpole said, Lord Cottenham would never grant an injunction unless in case of immediate danger.

The Chancellor: That is what we wish to ascertain. The doctrine of injunctions is perfectly settled. When it is called in aid of a legal right the legal right must be subsequently ascertained; but a case of pressure must be made out before its ascertainment to justify the injunction. Immediate danger is nothing unless it may produce an injury that cannot be compensated for by damages.

Mr. Daniell said he made the suggestion of an engineer to save delay and expense, as well as to inform the court on the facts in question.

The Chancellor: I am not entitled to act while there is a legal right in dispute. I am bound to act to suppress an immediate evil for which there is no legal remedy. I am quite ready to go through the whole of the affidavits, and hear both sides, but it strikes me that it would save time and expense if the parties agreed to take a course to promote a legal decision of the question.

Mr. Daniell was content to let the injunction stand over till Michaelmas Term, on an undertaking that the works should not be carried on to the injury of the plaintiffs.

Mr. Hill could not consent to that arrangement, for it would be to preclude his clients from executing their contracts. They had

hitherto strictly adhered to their previous undertaking, omitting to do many things they had a legal right to perform, such as laying their pipes in contact with those of the plaintiffs, for instance.

The CHANCELLOR then directed Mr. Daniell to proceed with the case.

Mr. DANIELL thereupon went on to read the affidavits referred to in his opening statement, together with the answers to the several allegations contained therein, and the replies to these answers. The allegations consisted of instances in which the pipes of the plaintiffs had been injured by the contact and weight of heavier pipes of the defendants, and embraced various parts of the City. Considerable discussion took place on almost every one of them, and at the rising of the court they were not concluded.

At half-past four o'clock the court was adjourned until next day at one o'clock.

FRIDAY, OCTOBER 11.

This morning his lordship called upon the counsel for the plaintiffs to state some instances of positive evil to his clients, such as breakage of pipes or explosion of escaped gas.

Mr. DANIELL then resumed his statement, and went on to adduce several instances of the mains and pipes of the defendants being laid over and upon the mains and service pipes of the plaintiffs, or being laid so close to them that there was no access for the purpose of repairs. The instances adduced referred to Aldersgate-street, Aldersgate-buildings, the south side of Gresham-street West, Redcross-street, &c.

The CHANCELLOR observed that it was not intended by the act of Parliament under which the plaintiffs were constituted as a company that they should have the power to exclude other companies. If other companies were not to be permitted to do that which they did, it would amount to a practical exclusion.

Mr. DANIELL only contended for the exercise of the right of enjoyment possessed by his clients, consistently with the proper enjoyment of the rights of other parties. He then went on to enumerate a great number of other instances—in Cheapside, for example, there were eight distinct allegations of injury.

The CHANCELLOR said several of the cases involved a question of legal rights. There was no case of a presumptive grant of an exclusive right to the plaintiffs. Parliament had not given the power for the purposes of monopoly.

Mr. DANIELL then went on to recite from the affidavits further instances of the bending and breakage of pipes, and of the carelessness and indifference of the defendants' servants, in Stoney-lane, Middlesex-street, Whitechapel; in Houndsditch, in Sun-street, in Camomile-street, in Bury-street, in Finsbury-place South, in Moorgate-street, in the Poultry, in Old Jewry, in Aldermanbury, &c.

The CHANCELLOR asked if all those instances of damage were followed by an escape of gas?

Mr. DANIELL said some were.

Two or three pieces of iron pipe were exhibited, two of which were very much bent, and one of them severely injured with a blunt pointed instrument—it was said a pick.

Mr. DANIELL argued that these were cases which, in his opinion, entitled him under the three specific heads of allegation laid down in his observations of the preceding day, to the injunction prayed for. The disregard of the property of the plaintiffs on the part of the defendants was of the most reckless character, as would be seen from the affidavits of the consulting engineer of the Gas Light Company and their inspectors and servants. The probability of further injury was still very great, seeing that there were 175 streets as yet to be supplied by the defendants. He was, therefore, justified in asking an undertaking that the plaintiffs should be protected in those districts. The learned counsel then proceeded to comment on the affidavits of the defendants, and argued that as his clients had possession of an easement, and as they were, under the provisions of an act of Parliament, subject to duties and liabilities for the neglect of which there were pains and penalties laid down by the statute, they were in a position to demand protection for their property, and the possession of that which was necessary to enable them to fulfil the contracts entered into with the public under the authority and sanction of the act of Parliament.

The CHANCELLOR: Certain duties are imposed on them by the act if they enter into a contract, for the protection of the public.

Mr. HILL: That is the amount of their obligation. It is voluntary.

Mr. DANIELL said it could be hardly considered as voluntary under the 15th of Geo. III.; it might rather be termed a statutable duty imposed on them. They were incorporated, it would seem, by the preamble of that act, to light the public streets. The act 4th Geo. IV., c. 119, sec. 37, imposed a penalty for breach or neglect of performance of contract in the case of the plaintiffs. His argument, therefore, was that as they were liable in penalties to the commission of sewers for the performance of their public contract to light the streets, and as the injuries inflicted on their property by the defendants prevented them from fulfilling the conditions of that contract, they were, as of right, entitled to a restrictive as well as a mandatory injunction. The learned counsel then went on to read further extracts of instances of injury, from the affidavits of Messrs. Burls, Lowe, Willock, Billows, and other witnesses.

The CHANCELLOR then asked was there a case of explosion from the injured pipes of the plaintiffs? If so, he wished it to be dated.

Mr. DANIELL detailed instances in which explosions were inevitable according to the affidavits, if they had not been prevented, and the cause removed by the workmen of the plaintiffs. They were at No. 68, Cornhill, at 69, Cheapside, and in Wood-street. The learned counsel then instanced other cases of actual explosion from the imperfect manner in which the mains of the defendants were laid, and the badness of the work; but they were mostly upon "hearsay" evidence, and arose from the leakage of the pipes of the defendants.

At half-past five o'clock the court was adjourned until the next day at ten o'clock.

SATURDAY, OCTOBER 12.

The Lord Chancellor sat again this day at ten o'clock, for further hearing.

Mr. HILL said, that in consequence of the proposal made by Mr. Daniell at the last meeting, and in respectful deference to the suggestion thrown out by his lordship, the solicitor in the case had thought it right to report to the board of the Great Central Gas Consumers' Company, who were fortunately sitting at the time the court rose, and they had, with their usual promptitude and decision, adopted a resolution, which he would, with his lordship's permission, read. It appeared to him to go much further to satisfy the justice of the case than the suggestions that had been made seemed to contemplate. His learned friend, Mr. Daniell, had at a former meeting distinctly stated that he did not intend to press for a mandatory injunction, and he urged his claim to an injunction at all as applicable only to that part of the City specified in his clients' affidavits in which the defendants' pipes had not yet been laid. In reading the important document furnished to him by the directors of the defendants' company, it was scarcely necessary for him to guard himself by any express language from an inference unfavourable to the legal and equitable rights of the company. His lordship had assented at their last meeting to the doctrine laid down by Lord Cottenham, that care should be taken so to deal with an application to the equitable jurisdiction of the court as would not prejudice the legal rights of the parties in any further stage of the proceedings. His learned friends, Mr. Walpole and Mr. Rogers, who were with him in the case, felt, with himself, that the plaintiffs had no ground for their application. They, however, approved of the manner in which their clients, without consulting with their counsel, had taken upon themselves to deal with the whole question, and he hoped their offer would lead to an amicable adjustment of the suit. At any rate it would not, he was convinced, be permitted by his lordship to operate now or hereafter, in that court or elsewhere, to the prejudice of the defendants, who made the proposal in the spirit of his lordship's suggestion, and not from any apprehension as to the result of the application.

The LORD CHANCELLOR said that it would be most desirable for all parties that some arrangement should be made to the effect proposed. Neither party could be prejudiced by the attempt, if unfortunately it should prove unsuccessful. It would be well to read the document, and if the plaintiffs' counsel should think it sufficiently important to deserve a more deliberate consideration, it would be perhaps desirable to have a further adjournment, to afford time for the purpose.

The ATTORNEY-GENERAL (who appeared with Mr. Daniell for the plaintiffs) requested that his learned friend Mr. Hill would read the document strictly, and with his usual disinterestedness, as he was totally unacquainted with its contents.

The LORD CHANCELLOR: There has not been time to furnish you with a copy. The resolution of the directors has, it appears, grown out of what occurred here yesterday afternoon. If necessary, the solicitor will furnish you with a copy.

Mr. HILL then read the following document, and, at the request of the Attorney-General, it was read a second time:—

"Great Central Gas Consumers' Company,
"Moorgate-street, Oct. 11, 1850.

"The directors received from their solicitors their report of the proceedings before the Lord Chancellor this day, and, having considered the suggestions that were made for the appointment of an engineer as a referee between the parties to inquire into disputed facts, or for a postponement of the case upon this company giving some modified undertaking, the directors desire their solicitors will inform counsel that, in consequence of the manner in which the past proceedings have been used to the prejudice of this company, the directors request counsel will ask for the judgment of the Lord Chancellor, and will enter into no voluntary undertaking, and will not agree to the appointment of an engineer, or other referee, unless it be to carry out the professed object of the suit.

"In order that the wishes of the board may not be misunderstood in this respect, the directors request their solicitors to lay before counsel the following observations:—

"The directors understand the plaintiffs profess that they have instituted the suit for two purposes:—

"1. To restrain the defendants, by means of a prohibitory injunction, from laying their mains so as irremediably to injure the plaintiffs' pipes and services.

"2. To compel the defendants, by a mandatory injunction, to remove the mains said to inflict the injury, and to force the company to make recompense for injuries said to have been sustained, so as to prevent occasion for a multitude of suits at law.

"The defendants entirely agree with the objects here professed, and they are willing to concur in any arrangements that will give them effect.

"The directors say, that, in the small courts and alleys named in the plaintiffs' affidavit where this company's pipes are now laid, they have no customers, and unless they get the contract for the public lights next March, or until they can by increased consumption reduce the price of gas so as to bring it within the reach of mechanics and others of the humbler classes who principally inhabit these places, this company do not intend lay their pipes there. The directors are willing to undertake to lay them down, when they do so, under the inspection of an engineer, pipelayer, or other competent referee, who will see that the plaintiffs' pipes suffer no injury. For this purpose the plaintiffs should undertake to furnish the engineer of this company with copies of the plans and sections of the ground where their pipes are laid, so as to enable them to avoid them. This has been refused by the defendant and their contractors. The directors deny that their contractors or their workmen have intentionally injured the mains, pipes, or services of the plaintiffs, and any unintentional injury they may have sustained this company are, and always have been, ready and willing to rectify or pay for. The directors claim a right to lay their pipes over, under, alongside of, or across the plaintiffs' pipes, provided that in so doing they inflict no injury on the property of others. If, contrary to the directors' orders, any negligent or treacherous workman has so laid any of the company's pipes as to injure the plaintiffs' pipes or services, the directors are willing, at their own expense, to repair the injury, and

to take proper measures to prevent its recurrence, under the directions of the referee.

"In these cases the plaintiffs should (as the directors submit) be called upon to point out the injuries complained of. If the complaints are found by the referee really to exist as charged, the company should pay the expense of re-opening the ground, and of making good the pavement; if, on the contrary, the referee finds the complaints are frivolous and vexatious, the expenses should be borne by the plaintiffs.

"The defendants have reason for believing that the whole amount of injuries sustained by the plaintiffs cannot, under any circumstances, exceed from £100 to £200.

(Signed) "THOMAS DAKIN, Chairman.
"ROBERT M. MASSEY, Secretary.

"P.S. It is alleged in the affidavits that the plaintiffs own that they derive no profit from the gas supplied for the public lights in the courts and lanes described in their affidavits as places where the defendants have not yet laid down their pipes. If, before the company lay down their pipes and services in those districts, the plaintiffs shall be desirous to decline continuing to serve them, the directors will be willing to relieve the plaintiffs by purchasing their pipes and services at a valuation."

The LORD CHANCELLOR: I am not sure that I understand the proposition. If I do it is this—The plaintiffs say it may be that the defendants profess to supply cheap gas, selecting the places that are profitable and abandoning, deserting, or never going to those places where it unprofitable; by which the defendants say, if you are supplying gas in places which are unprofitable, we will take your place and supply at the same price. That is a question much too complicated to be decided at a moment.

Mr. HILL: Your lordship will not say that it is unnecessarily complicated?

The LORD CHANCELLOR: Quite the reverse—quite the reverse. I should rather have said that it embraces too many important points to be considered at a moment.

The ATTORNEY-GENERAL: I am not sure that I quite understand my learned friend. Do I understand that, with respect to those places in which he has no customers, that he will undertake not to lay any pipes at all?

The LORD CHANCELLOR: No; he will either not lay them, or if he does it shall be under the direction of some referee who will take care that they are laid properly.

Mr. HILL: Or, even if we have no customers, we will consent now to take the pipes at a valuation.

The ATTORNEY-GENERAL: Your lordship will observe that this is a most important question, and requires consideration. Our injunction asks, that they may not be permitted to lay pipes where they have them not at present.

The LORD CHANCELLOR: Simply their proposition is, that they do not at present profess to lay the pipes in these places, but if they do hereafter, they shall only do so under inspection.

Mr. HILL: The directors are willing to lay the pipes in those places under the inspection of a competent engineer, pipe-layer, or other party, but they have no intention of doing so at present.

The ATTORNEY-GENERAL: But they might alter their intention next week, and begin to lay the pipes. That is, therefore, no part of the undertaking.

The LORD CHANCELLOR: It might be struck out altogether.

The ATTORNEY-GENERAL: What I understand is—when they propose to lay pipes in those places they shall be laid under the inspection of a competent referee.

The LORD CHANCELLOR: It is the simplest thing in the world. What they do in future they will do under the direction of a referee, and with regard to what is past they will pay for whatever injury they may have done.

Mr. HILL: With this addition, to which I invite the attention of the Attorney-General, that they are to furnish us with certain prescribed means of ascertaining where their pipes lie.

The ATTORNEY-GENERAL: I do not suppose there will be any difficulty; but the question will require consideration. Of course I cannot exactly state what view my clients may take of the proposition.

The LORD CHANCELLOR: The only question now is, whether there is enough on the face of it to make it expedient to be considered.

The ATTORNEY-GENERAL: We shall insist on this at least, that if there be a case in which they cannot by possibility, and with the utmost possible skill, lay their pipes without injury to ours, in that case they cannot go into those places.

Mr. HILL: I do not think the act of Parliament ever contemplated that your powers should operate to the exclusion of all others. If you do lay your pipes so as to exclude others, that would open a totally different question.

The ATTORNEY-GENERAL.—All we claim is the right to protection. If we have done anything fraudulently, so as to prevent parties doing anything hereafter, that would open a new question.

The LORD CHANCELLOR: You are not to lay them so unskilfully as to exclude others. You cannot enjoy a privilege on such terms. There is, it strikes me, quite enough in this proposition to render it deserving the consideration of both sides with a view to avoiding expense and inconvenience in every possible way. They say we will lay our pipes so as not to injure others wantonly and unnecessarily, and we will do that under a referee. Now, if the referee comes to the conclusion that they cannot lay them without injury to the plaintiffs, the question will arise what course ought to be pursued?

Mr. HILL: I will just throw this out for the consideration of my learned friend. It may have happened that, without any fraud, the pipes of the plaintiffs were laid in what was the most convenient way at the time, but so as to offer an impediment to any future company; and it may be that a slight removal or alteration of position of the plaintiffs' pipes will get rid of this difficulty. And as the act of Parliament did not contemplate the exclusion of others, my learned friend may be induced to submit to such an alteration as will obviate that.

The LORD CHANCELLOR: If the manner in which the pipes were laid operated to the exclusion of others, I have no doubt there would be a parliamentary remedy.

The ATTORNEY-GENERAL: A parliamentary remedy, of course—a parliamentary remedy, without question.

The LORD CHANCELLOR: It will, probably, not be convenient at this moment to fix a time for hearing the case again; but I shall be ready at any time between this and term, on receiving a day's notice.

Mr. HILL: Meantime we must be relieved from the inconvenience we are now lying under.

Mr. DANIELL: Recollect that we do not press for the mandatory injunction.

The LORD CHANCELLOR: Your present undertaking is simply not to do what you do not profess to do.

Mr. WALPOLE here suggested that there ought to be a plainer definition of the word "interference" in the undertaking. It was capable of a very wide construction, and he proposed to substitute "injure or impede."

The LORD CHANCELLOR: The word interference will not be construed to apply to interests.

The ATTORNEY-GENERAL: If you take away our customers, we shall not consider that interference.

The LORD CHANCELLOR: I should suggest to you, Mr. Walpole, to leave it as it is.

Mr. HILL: In districts in which we have pipes down, there are still 700 services to be put in. Now, in some cases, that putting in will be impeded by the refusal of your officers to permit your service pipes to be taken away from the houses of persons who have ceased to be your customers.

The ATTORNEY-GENERAL: We certainly object to your taking away our service pipes. Suppose the inhabitant is a tenant at will, and leaves in a short time, the next tenant may require us to supply him.

The LORD CHANCELLOR: But if you have your pipes in such a way as to prevent the other party supplying a man who will not take your gas?

The ATTORNEY-GENERAL: It does not appear that such is the case; and the defendants' undertaking is not to interfere with our pipes. If they cut off one of our service pipes, I doubt whether that would not be considered such an interference.

The LORD CHANCELLOR: Do you think you can keep down pipes in a street where you have no customers, so as to prevent them laying their pipes?

The ATTORNEY-GENERAL: That is a legal question.

The LORD CHANCELLOR: It is a hard legal question.

Mr. HILL: It is in vain that the plaintiffs repudiate the charge of desiring a monopoly, if they say they have a right to retain their pipes in such a position as to prevent others supplying the public.

The LORD CHANCELLOR: It is somewhat of the dog in the manger principle.

The ATTORNEY-GENERAL: That is not the correct way of putting the case. The question is, whether the undertaking is not put an end to by their cutting away our service pipes.

After some further discussion, it was arranged that the parties should meet again some day in the course of the ensuing week, due notice being given by the plaintiffs to the defendants.

The court then adjourned.

[It will be seen from the report of the meeting of the Great Central Gas Consumers' Company inserted elsewhere, that negotiations are still pending between the parties, at the suggestion of the Lord Chancellor, which have not yet been brought to a close.]

Miscellaneous News.

ASSOCIATION OF GAS FITTERS,

96, ST. MARTIN'S-LANE, LONDON.

LECTURE BY ALEXANDER WRIGHT,

TUESDAY, OCT. 8, 1850.

The most enlightened persons engaged in this branch of mechanics are now attempting to form an association of their fellow-tradesmen, for the purpose of spreading amongst its members an acquaintance with the sciences subservient to their pursuits, and to encourage inventions tending to improve the application of the inflammable gases to the uses of life.

Such an attempt is highly laudable, and likely to produce good, not merely by rendering this class of mechanics more efficient, but also by strengthening the bonds of unity and good will between employers and their workmen.

The inaugural lecture was this evening delivered by Mr. Alexander Wright, the subject assigned to him being COAL GAS, its composition and economy for the production of light. Our readers have already seen in our columns how peculiarly at home the talented lecturer is upon these questions; to give the first part of his remarks here would be but to repeat what has already been more deliberately given in several articles bearing his signature; but the following extract from our report so graphically sets forth the means by which the value of any light may be determined by experiments within the reach of ordinary capacities, that we cannot refrain from presenting it to our readers:—

"The next matter to which I wish to call your attention is the distribution of light. Light radiates in divergent rays from every luminous point of a flame, and in every possible direction. Now, if you could conceive that flame to be a star, or rather a ball, with so many points projecting to every part of the room, you would have some conception of the manner in which light is distributed. I may not be right in saying the 'radiation' of light, for modern science has almost proved that the *wave* theory is to be adopted in place of *radiation*. But the radiatory theory will serve the purpose of a popular explanation. Imagine it to be a porcupine or a hedgehog;

with so many spears starting from its body in all directions, and it will give you an idea of what I mean. It is not only the nature of flame to radiate in every possible direction, but to do so from every possible point of the flame. This flame is in itself a number of flames or balls radiating in every possible direction.

"It is a commonly-received opinion that the flat side of a flame gives out more light than the edge of it. I have seen many turn them round in order to get a better light. Now, this is a fallacy; the flat side in itself is a number of luminous points—indeed, it is made up of some millions of balls, and every one of them is radiating in every possible direction; these rays illuminate the space presented to the edge, as well as that presented to the flat side, and, consequently, there can be no difference in the amount of light distributed from different points.

"I think you have now a clear conception of flame, that it is not one isolated thing, but an innumerable cluster of luminous points. If we are desirous of estimating how much light comes from any luminous body, we must gather the whole of it by an immense reflector, and shoot it out in a particular direction, and contrast it by another reflector shooting a different light in another direction. This would be almost impossible. We must, therefore, seek some other means. Now, if every part of the flame is doing as much as every other, this law will follow—that every part surrounding the luminous flame is illuminated equally, and any one part may, therefore, be taken as an index of the whole. The next law is deduced in the following way:—Suppose this globe surrounded that flame, every square inch of the globe would receive an equal amount of light. If you made the globe twice the size, you would at first suppose that it received on each inch half the light, but the superficies of globes are as the squares of their diameters, and if one globe is twice the diameter of another, it will have four times the surface, and, consequently, will receive only one-fourth of the quantity of light in any particular part. From this consideration this law arises—that light on being projected from any flame diminishes in intensity in proportion to the square of the distance.

"When we lay down laws of this kind, we should always see whether there are not some exceptions to them, and here we find one of importance. In theory it is quite true that a light or flame radiates in every possible direction, yet it frequently happens that, from the particular mode of obtaining that light, there must be some part of the apparatus absorbing the rays. This candle, for example, throws a shadow; so does every candle. The solar-lamp on the table has an immense opaque body, and, consequently, it is not true of it that it distributes light equally in every direction. A great portion of it absorbs the light, and therefore some allowance must be made for these things in photometrical experiments. I find that the quantity of light given from a candle is diminished one-eighth by the opaque body of the candle, that is to say, one-eighth of the sphere that surrounds the flame is prevented from receiving light. One peculiarity of gas burners is that they are made almost shadowless, and, therefore, they radiate almost equally in all possible directions, on account of not requiring any reservoir near them.

"From these laws, if we can find any means of determining at what particular point two lights are distributing equal amounts of rays, by measuring the distance, we can then ascertain exactly what relation these lights bear to each other. The first photometer we placed reliance on was that invented by Count Rumford. In some operations I prefer it to any other. In others, the screen invented by Bunsen, and perfected by Mr. King, of Liverpool, is preferable. To the latter we now generally apply, because it speaks more directly to the senses. Both, however, have their defects, but I could show, if we had time, how effectually each corrects the defects of the other. The course pursued by Count Rumford was this. [The lecturer here projected shadows on the wall from his pencil.] You observe two shadows on the wall. Now, remove one of the lights farther from or nearer to the wall, and these shadows become more or less dense. To estimate by Count Rumford's photometer the exact amount of light given by two burners, we put up an opaque body to prevent the rays of light from passing to a particular part of the wall. When these two shadows are of exactly the same intensity, we measure the distance of the candle and the gas-light from the wall, and then, by squaring the distances, we get the relative amount of light. When the lights are of different colours, when one shadow is brown and the other blue, it is not very easy to tell which is most intense. The rays intercepted from the candles produce a shadow, and the gas-light illuminating that shadow colours it blue; on the other hand, the shadow cast by the rays intercepted from the gas-light is changed into brown by the candle-light. It is always difficult to tell which is the densest: for my part, I find this to be the best recipe—not to depend upon shadows, nor to put up a piece of white paper, but a closely printed paper, and see through which shadow you can read the best. The light with which you can see to do the finest work is the best. Every photometric experiment refers to the eye—the eye is, therefore, the best test. I think we can see within one or two per cent. what is the difference between the two lights with these two photometers. Some say they can come much nearer. Five per cent., I think, would do exceedingly well. Bunsen's photometer consists of a piece of blotting paper covered with spermaceti, a small portion of the centre being left in its original state. The effect of the grease is to make all that part around the centre semi-transparent; the centre itself is almost opaque. If this photometer is placed between two lights, and an equal number of rays proceed from each, the transparency will be done away with; for a thing never appears transparent unless a greater light is on the opposite side than on that nearest you. In this paper you see, on placing it in a certain position, the spot will almost disappear. If one light is red and the other blue, there is a considerable difficulty in ascertaining which side of the paper is most illuminated, but it so happens that the side which appears the most may not be so; you are deceived for the better in the one side, for the worse on the other side, of the paper. My plan is *not* to notice when the spot *disappears*, but to notice when the two sides are as nearly as possible *alike*. There will still be a spot in both centres, and it will be your business to determine the balance as much on one side as on the other. In this way you will find a mean, and in two or three operations of that kind this instrument will be found to be susceptible of great accuracy. At the present moment this instrument [referring to the one before him] is standing at about 9 to 9½ candles; a room like this is not, however, capable of photometrical experiments.

"One improvement which I made on King's photometer was that, instead of sliding the lights backwards and forwards, which produce considerable oscillation, I calculated a scale by which the lights were made stationary and the photometer moveable.

"There is another great point to which I wish to call your attention, and that is, never attempt to make a photometrical experiment unless the squares are marked on a scale, for when men are dealing with inches they often make mistakes. The one-eighth of an inch in one part of the scale is of as much importance as two inches in another. I recommend, therefore, that the scale may be calculated in this way for sake of accuracy.

"I did intend to call your attention to the advantages of cannel gas in producing light, but motives of delicacy will now prevent me. My principle for many years has been, that the engineer who can produce in any given locality the greatest quantity of light, for the least amount of money, is most to be commended. The man who produces the greatest quantity of volume, without regard to illuminating power, might as well not study engineering at all. When this agitation began about cheap gas, had gas companies but improved the quality of the gas they would have conferred an advantage on the public without any loss to themselves. I never met any one connected with them but I said, 'You can give the public one shilling in quality where you cannot give them sixpence in the price.' You have been dealing with a false standard—with a meter without a photometer. Why not say to the public, 'We can light your shops better and cheaper if you will only believe us and become educated on the subject.'"

On the motion of the chairman, thanks were voted to Mr. Wright for his interesting lecture.

Tuesday, Oct. 22, 1850.

Edwards's Atmopyre—Gillard's Hydrogen Light.

This evening, at the request of the committee, Mr. D. O. Edwards, surgeon, of Brompton, gave a lecture upon the principle of his invention, the Atmopyre. Having become a member, the lecturer made a few preliminary remarks on the scope and objects of the society. Gas fitting, he said, had now become so important a branch of engineering, that those who would successfully undertake it as a profession, ought to arm themselves with extensive knowledge of physics, chemistry, and mathematics. Such an acquaintance with science enlarged and liberalized the mind, and made men more open to the reception of new truths. Mere practical skill sometimes narrowed the conceptions, and fortified prejudices.

"I conceive," said the lecturer, "that much of the time of these meetings will be employed in the discussion of new proposals, and I would fain hope that all novelties that may have any basis in reason will be received with indulgence. The progress of mankind has been much retarded by too rigid an adhesion to what is called *practical* knowledge. It has sometimes been forgotten that truth has three stages of development; hypothesis, theory, and practice. Hypothesis is the question put; theory is the question answered in the affirmative; and practice, the truth generally accepted and applied. In the case of the Britannia Bridge, the proposal of Mr. Stephenson to Messrs. Fairburn and E. Hodgkinson, as to the strength of iron tubing, was a hypothesis. Their affirmative reply was the substantiation of a theory by experiment; and the passage of long and heavy trains through those wonderful tubes is the practical result. The application of coal gas to the production of light and heat, now so substantial a reality with us, was once a hypothesis, and then a theory much in disrepute, as poor Winsor knew to his cost."

Passing slightly over the subject of the *nature* of heat, which, whether considered with Lavoisier as an imponderable substance, or with more modern investigators as a quality of matter, did not affect his purpose, which was directed to some of the well-ascertained properties of heat, Mr. Edwards thought the use of the term *caloric* useful, if employed with a certain mental observation.

An accurate knowledge of the properties of heat was indispensable in all the arts in which fire was employed; and necessary to the clear understanding of the Atmopyre. The laws of *expansion* in solids, liquids, and elastic fluids, explained the phenomena of refractoriness, convexion, and evaporation.

Conduction, or the transfusion of heat from particle to particle of the same body, a property so variously exhibited in different substances, ought to be understood by all who would control the power of heat to useful purposes.

The behaviour of numerous bodies in regard to *radiation* was of vital importance in many of the most opposite arts. The potter, the gardener, and the medical man had constant need of reference to this principle. Brongniart, the superintendent of the Sevres porcelain works, had such a superstitious regard to this quality of heat, that he always contrived that his kiln should be put out in the day time, in order that the cooling of the goods should not be too much accelerated by the radiation of the earth at night. The *reflection* of heat had recently been made use of in the construction of stoves, for the purpose of directing more heat into apartments, and it was taken advantage of in the construction of the "atmopyre roasters," where a white and highly glazed earthenware reflected a considerable quantity of rays upon the meat.

Latent heat, first noticed by Fahrenheit, and afterwards elucidated by Dr. Black, was necessary to the comprehension of the steam engine, and, if well considered, would probably explain many phenomena now imperfectly understood. But *specific* heat was perhaps

the most important of all; for the difference of solids in regard to this property was so great, that interesting results might be obtained by an accurate comparison of the capacities for heat of different materials.

These properties are the handles by which we manage heat.

Setting aside the consideration of all other *sources of heat*, the lecturer confined himself to the consideration of hydrogen, the hydrocarbons, and the other fuels having an affinity for oxygen. Of these, hydrogen, discovered in 1781 by Mr. Cavendish, was, perhaps, the most interesting, in consequence of the efforts of M. Gillard and other chemists to produce it so cheaply as to make its use economical for domestic purposes. Mr. Edwards exhibited a table of the comparative heat-producing powers of equal weights of fuel. Of these, hydrogen was by far the most powerful generator of heat, its number, according to the experiments of Dalton, being 24,000, whilst that of carbon was only 3000; marsh gas, 6300; and olefiant gas, 6600. If this important body could be procured, as M. Gillard stated, for 6d., the 1000 cubic feet, no doubt it would effectuate an immense amelioration of the health of towns. The properties of coal gas, a mixture of olefiant gas, light carburetted hydrogen, and simple hydrogen, in varying proportions, had been explained by Mr. Wright on a previous evening, as a source of light. Its use as a fuel the lecturer demonstrated in a small atmopyre placed on the table. The gas burnt at first with a pale blue flame, the clay hoods became red hot in three minutes, and the containing case in seven minutes.

Oxygen, the great supporter of combustion, was of immense importance to the gasfitter; the object of every new burner was to insure a more perfect supply of oxygen. The contrivance for what is called the mixed gases aimed at the same result, and the atmopyre owed its efficiency to its affording a larger surface than any other apparatus, for the union of oxygen with the fuel.

To supply oxygen was also the aim of all schemes of ventilation. Without oxygen animal life could not be sustained many minutes. Some years ago, when animal chemistry was not well understood, Dr. Beddoes, the friend and early patron of Sir Humphry Davy, formed a scheme for the cure of consumption, by the exclusive inhalation of hydrogen. He built chambers on purpose, perfectly airtight with double windows, and filled with hydrogen. The patients felt relieved for a few moments, but soon they had an intolerable sense of suffocation, and broke the windows to relieve themselves.

This threatened asphyxia was due to the absence of oxygen, not to any noxious property in the hydrogen, as has been proved by recent experiments on respiration in Paris, where hydrogen has been substituted for nitrogen, and mixed with a due proportion of oxygen. Birds and other animals were placed in glass cases filled with hydrogen; into these oxygen was gradually supplied, so as to keep up the normal proportions, and the carbonic acid was carried off by a contrivance by which the artificial atmosphere was made to circulate through lime-water. In order to illustrate the properties of oxygen and its great appetite for combustion, Mr. Edwards burnt phosphorus, carbon, iron wire, and hydrogen gas in receivers of oxygen, producing a brilliant development of heat and light. Having considered the comparative calorific power of various fuels, solid, liquid, and gaseous, Mr. Edwards explained the principle of the atmopyre, already fully described in this Journal, and proceeded to compare its performances with those of ordinary fires and furnaces.

The lecturer now described what he called the anatomy of a fire. A perfect fire is an aggregate of pieces of fuel piled loosely so as to leave interatices for the free admission of air; certain points on the surface are first attacked by the combustion which gradually spreads till the whole exterior of each piece is in a state of ignition.

From this state of things three disadvantages flow:—1. A portion of the fuel escapes unconsumed. 2. There is a necessary irregularity in the generation of heat; and 3. A great loss of heat ensues from its combination with the products of combustion.

1. The surfaces of the fuel are first burnt; but as coal is a bad conductor, the adjacent strata are heated to various degrees in proportion to their distance from the surface of combustion, but sufficiently to decompose the coal or wood, and extricate a quantity of gas which escapes unconsumed, and thus a waste is occasioned.

2. The extent of the combustible surface gradually increases until it reaches its maximum, when the whole cinder is red hot, then it necessarily diminishes as the fuel crumbles away. The heat is still further lessened by the introduction of fresh fuel. Again the heat augments and again falls, and thus a perpetual oscillation is kept up, highly injurious in some of the arts.

3. It being absolutely necessary that the air should penetrate into every crevice of the fuel, it is driven by means of shafts and other implements, as well as the attraction of the fire itself, with such force and velocity as not only to fulfil its mission of supplying oxygen and separating the burning particles from the incandescent matter, and thus affording new surfaces for combustion; but it carries away with it *nine-tenths* of the heat generated.

These facts explain the formation of smoke, and point out the means of averting it. Smoke is the effect of imperfect combustion; and combustion is imperfect, because the fuel is presented to the action of the oxygen in such large pieces as cannot be consumed at once. If we suppose the fuel sufficiently minced, it would immediately unite with the oxygen, and no smoke would be engendered.

By pulverizing coal to infinitesimally small grains and sprinkling them over flame, perfect combustion has been effected by Mr. Edwards; but the manipulation was too troublesome to be practical.

The inflammable gases present a fuel already sufficiently subdivided and capable of combining rapidly with oxygen. But a gas flame is flickering and unequal in the radiation of heat, owing to the varying convexion of the surrounding air.

How could the steady properties of a fire be given to the ever mobile flame? A perfect fire consists of a surface of combustion in contact with a solid substratum of heated fuel in the shape of a red-hot cinder. A flame consists of a surface of combustion only; the desideratum was the solid substratum.

This substratum Mr. Edwards, guided by the analogy of flame and the Davy lamp, has supplied in the atmopyre, which consists of surfaces of combustion imitative of the convoluted interior of a perfect fire, and of masses of radiant incandescent material supplying the place of the solid fuel. As in the red-hot cinder, the surface of combustion includes the whole exterior of the "artificial ember," but the "hood" is unconsumable, and maintains its size. The heat-generating power is equal and unvarying from the beginning, and much greater steadiness of heat is maintained than in an ordinary fire. These "hoods" have now been in use for nearly twelve months, and they are not found to wear in any degree. Mr. J. T. Pitt, of No. 8, Piccadilly, thinks they are improved by use. This gentleman employs them to heat his smoothing irons, and has, therefore, constant opportunities of observing them.

Placed in contrast with ordinary fires, where fuel is wasted abominably, the triumph of the atmopyre is easy; but it is subjected to a more severe trial when fire is applied to the arts, where great intelligence has been expended in the use of fuel. In the construction of steam-boilers especially, and particularly in Cornwall, the greatest value seems to be extracted from the coals, but, from the explanations just given, a great loss is inevitable wheresoever solid fuel is used. In the furnaces of steam-boilers all loss by radiation and conduction seems obviated, but the waste by convexion is immense. The great shafts and funnels pump up the heat into the waste of air with almost the force of volcanoes. It is by the saving effected in the regulated convexion, that the economy of the atmopyre is evinced.

From the mean of the several experiments of Mr. G. H. Palmer, it appears that one foot of coal gas consumed raises its own bulk of air to 20,000° Faht. As the specific heat of water is four times greater than that of air, if this 20,000° Faht. could be imparted to the water, its temperature would be raised to 5000° Faht. But, from the fugitive nature of heat, this is impossible; and all we can do is to subtract as much heat as possible from the products of combustion by keeping it in contact with the surface of water sufficiently long to reduce its temperature to 212°.

One foot of coal gas requires for its consumption twelve feet of air; thus making a total of thirteen feet immediately before ignition. Supposing the temperature the same, the bulk after ignition would be the same as before, because carbonic acid occupies the same space as oxygen, and the aqueous vapour supplies the place of the hydrogen. The law of expansion for all gases is this, that the bulk of them is doubled at 400° Faht. above zero*; and as the specific heat of the products of combustion is pretty much the same as that of air, and supposing the temperature of these products to be 212° Faht., we may safely calculate the said products to have expanded to twenty cubic feet. Thus, $20 \times 212 = 4240°$ Faht., to be deducted from the 20,000° Faht. of Mr. Palmer, and leaving a remainder of 15,760° Faht. theoretically applicable to purposes.

The said 20,000° Faht., considered in relation to air, may be used much more effectually than in relation to water by skilful resistance to conduction, radiation, and convexion. By insulation of the fire in earthenware, and the propelling of the products through successive perforated plates and tubes of the same material, these products may be brought down to the temperature of the atmosphere, and no heat be lost.

But actual performances fall miserably short of theoretical possibilities. The atmopyre, by the skilful application of its envelopes, becomes an economical source of heat; but its performances in the evaporation of water do not yet equal Mr. Edwards's expectations. Its present accomplishment is, that one foot of gas evaporates a pound of water; at this rate, sixty feet of gas would be equal to one-horse power.

According to Mr. Davies Gilbert's tables of the performances of the Cornish engines, the quantity of fuel required for each horse power diminishes as the size of the furnace increases. Thus, a furnace of one-horse power consumes 20.7 lbs. of coal every hour; a ten-horse power consumes ten pounds of coal per hour for each horse power, and a furnace of 100-horse power consumes 5.5 lbs. for each horse per hour.

Reasoning from analogy, Mr. Edwards concludes that the present performance of the atmopyre justifies him in tabulating it as follows:—

60 feet of gas generates one-horse power.
30 feet of gas equal to one-horse power in a ten-horse power engine.
20 feet of gas equal to one-horse power in a hundred-horse power engine.

At present the conclusions are hypothetical and have to be confirmed. With a view of testing these results the Chartered Gas Company have handsomely proposed to erect a large boiler for Mr. Edwards. Mr. Reynolds, of Grafton-street, is now constructing a boiler for Mr. Edwards equal to a two-horse-power, in which he proposes to test by evaporation the calorific powers of several of the inflammable gases. In these experiments he will be aided by Dr. Bachhoffner, of the Polytechnic Institution, a gentleman eminently skilled in the philosophy of heat. This boiler will be perfectly guarded against loss by radiation and conduction, and, in order to reduce the loss by convexion to a minimum, the flues will be made of very narrow dimensions, and elongated as much as possible through the water. The atmopyre alone renders this practicable, the combustion being perfect. In the case of fires, and even of gas flame, such an arrangement could not obtain, because the slender flues would be choked with deposited soot.

The atmopyre has been applied to manifold useful purposes, besides the domestic ones of warming and cooking. It desiccates delicate aromatic plants, evaporates extracts, distils medicinal waters, &c., and Mr. Dethridge is applying it to the ventilation of the Senior United Service Club.

But the most interesting application of it, perhaps, is the smelting of the precious metals. Messrs. Verdin and Shipwright have had an

* Vide Dr. Fownes' "Manual of Chemistry," and Pouillet's "Elemens de Physique."

atmopyre furnace built in which they melt their gold. This apparatus consists of two rows of hoods about four inches high, ranged circularly, and a cluster of hoods placed in the centre, but sunk below the side-hoods so as to leave a space for the melting-pot. The whole arrangement is included in a double earthenware case, with perforated flooring for the admission of air. Placed on the rim of the inner case is a circular blow-pipe constructed by Mr. Verity for Mr. Edwards, who names it his *coronal* blow-pipe. The gold is placed in the pot, the furnace is covered over with an earthenware perforated tablet, a suspended bellows in connection with the blow-pipe is gently pulled, the flame is directed on the melting pot, and the metal is reduced in a few minutes.

With a view to exhibit the heat-generating power of hydrogen, Mr. E. burnt some of it in a single hood. The hood was heated to redness in one-third of the time required with coal gas. A receiver of oxygen was placed over the hood, and its temperature was raised to an intense degree, and a brilliant illumination was produced. Thus simply was manifested the striking fact, that the two constituents of water for a moment separated by art, again combined with such a furious energy in combustion, that a dazzling incandescent ember was presented to the view as long as the supply of gases was continued, which was for some time.

Having a good supply of hydrogen left, Mr. Edwards invited his friend M. Gillard to exhibit his beautiful platinum burners. The illumination was very effective; a platinum burner consuming 6 feet an hour eclipsed a large batswing shining near it. The character of the light is so integral that colours are truly shown by it. The radiation taking place from solid surfaces, and not from mobile ones, no decomposition of the light consequently takes place by refraction.

M. Gillard mixed one-fifth of atmospheric air with the hydrogen, which produced an increased brilliancy. The exhibition of the light elicited the applause of the audience.

After a sensible speech from Mr. Detheridge, the thanks of the meeting were voted to Mr. Edwards and M. Gillard, and many new members were admitted.

Messrs. Copeland, of 160, Bond-street, and Stoke-upon-Trent, are the manufacturers of the various forms of the atmopyre.

THE METROPOLITAN SUBURBAN GAS QUESTION.

EAST PANCRAS PAROCHIAL ASSOCIATION.

On Friday evening, the 11th ult., a very numerous meeting of the association took place at the Globe Tavern, Derby-street, King's-cross.

Mr. GREENWOOD, a member of the vestry, took the chair.

Mr. JOHN WORRELL, the chairman of the recent deputation to the Imperial Gas Company, said he had much pleasure in laying before the meeting a communication from the Imperial Gas Company, officially announcing a reduction in the price of gas. (Hear, hear.)

Mr. BEEVOR, the hon. secretary, then read the communication as follows:—

"Imperial Gas Light and Coke Company, 33, John-street,
"Bedford-row, Oct. 10, 1850.

"Gentlemen,—I have great pleasure in informing you that the Imperial Gas Company have this day determined to reduce the price of gas by meter to 5s. per thousand cubic feet, from and after the 1st of January next.

"I am, gentlemen, your obedient servant,
"ALEXANDER HENRY, Sec.

"To Mr. John Worrell, Mr. Concanen, Mr. Stockton, Mr. Denman, Mr. Beevor, and Mr. Hanshaw, members of Deputation from the East Pancras Parochial Association."

Mr. STOCKTON moved, and Mr. CRAMP seconded, a resolution, "That this communication be entered on the minutes of the association."

MR. PEARSE said, as a ratepayer of St. Pancras, and at the same time a considerable shareholder of the Imperial Gas Company, he was desirous of offering a few observations. He had attended at the meeting of the shareholders of the Imperial Gas Company on the previous day, when it was decided to reduce the price of gas to 5s. per thousand cubic feet. The chairman of the company, Mr. W. Parry Richards, mentioned to the meeting the various deputations which the directors had received upon the subject, and he took occasion to remark on the contrast there was between the courteous tone assumed by the deputation from St. Pancras, as compared with the abrupt and bullying conduct of the Islington people and a deputation from Highgate. They might depend upon it that it was the fair and conciliatory way in which the St. Pancras people had met the question, that had done more to cause the present reduction in price than all the abuse which the people of Islington could have heaped upon the company for years to come. He (Mr. Pearse) intimated to the chairman that he was under a pledge to a meeting at Islington and elsewhere, to bring the subject forward, but as the chairman had himself announced the reduction, such a course was unnecessary. The reduction was assented to by the proprietors; and on that morning upwards of 20,000 of the following circulars had been issued by the Imperial Company to their consumers:—

"Imperial Gas Light and Coke Company, 33, John-street,
"Bedford-row, Oct. 10, 1850.

"The Imperial Gas Light and Coke Company hereby give notice that the price of gas by meter will be reduced to 5s. per thousand cubic feet from and after the 1st of January next, and that the charge by scale for the fifteen hole argand burner to burn from sunset to nine o'clock, six days in the week, will be at the rate of £2. 5s. per annum, and other burners in proportion.

"By order of the directors,
"ALEXANDER HENRY, Clerk to the Company."

Thus had gas been reduced from 17s. to 15s., and so on, now down to 5s. per thousand by the Imperial Company. (Hear, hear.)

Mr. LUMB said the Imperial Company had not alone reduced their price, for he, as a consumer of the gas of the London Company, had that day received the following notice:—

"Office of London Gaslight Company, 26, Southampton-street,
"Strand, Oct. 10, 1850.

"Sir,—I am instructed to acquaint you that from and after Christmas next the price of gas supplied to the company by meter, will be at the rate of 5s. per thousand cubic feet. The price for fifteen hole burners used until nine o'clock for six days in the week, will be £2. 5s. per annum, and a corresponding scale for burners of other sizes.

"I am, Sir, your very obedient servant,
"JOHN R. HINDE, Sec."

(Cries of "hear, hear.")

Mr. STOCKTON said he could not refrain from offering his congratulations to that association on the successful result of their efforts in this matter. They went to the directors of the Imperial Company, not in the unhandsome and threatening mode which other parties had adopted, but whilst they with firmness expressed the wishes of the ratepayers of St. Pancras to the Imperial Company, still they treated the company with that courtesy which as a public and commercial company they were entitled to. (Hear, hear.) He saw that at a meeting of the Marylebone Parochial Committee a Mr. Belton had, with an ignorance of the common courtesy which was due from one public body of gentlemen towards another, designated the St. Pancras deputation as toadies. That excellent reformer, Mr. Henry Charles Wilson, had at the same meeting, well knowing as he did the character of the men, defended them from the charge of toadyism, and made Mr. Belton shrink into the same insignificance as a certain gentleman in Islington who tried the bullying principle to his own discomfiture. (Hear, hear.) The course adopted by Mr. H. C. Wilson on that occasion proved him still to be that honest man which he had ever been in his (Mr. Stockton's) estimation. The result of this gas matter had proved the usefulness of these associations, and he believed their exertions would be appreciated by their fellow ratepayers. (Hear, hear.)

Mr. WORRELL: No one could have read the speech of Mr. Belton but with a feeling of disgust, and they must all feel for the ignorance of a man who would convert firmness, combined with common respect, into what he was pleased to denominate toadyism. Mr. Wilson, had, however, very properly dealt with such a person, and had done justice to the motives and actions of the association, who were entitled to the thanks of their fellow ratepayers in this matter. (Hear, hear.)

After some further discussion the motion was carried unanimously.

CITY OF LONDON COURT OF SEWERS.

A numerously-attended court of the Commissioners of Sewers for the city of London was held on the 29th ult., at the Guildhall, for the despatch of business; Deputy Peacock in the chair.

THE GREAT CENTRAL GAS CONSUMERS' COMPANY AND THE BREAKAGE OF THE STREETS.

Mr. HAYWOOD, the surveyor, mentioned to the court that much inconvenience was caused by the conduct of the Great Central Gas Consumers' Company, in neglecting to give notice to the officers of the commission of the holes they were from time to time opening in the streets. (Hear, hear.) Within the last week notices had been entirely discontinued, and the consequence was that holes remained unpaved which should have been paved over, and of course not only annoyance but danger was incurred. He had written to the officers of the company, and also to the chairman, and he had seen the chairman, who told him the blame lay with the contractors, who were opening the pavement in order to ascertain from what parts of the pipes the escape of gas came, as they were bound to make good the joints from which the leakage was made. He had also seen an officer of the company that morning who had assured him that, in future, notices should be invariably sent to the commissioners; and he had informed that officer that the commission only recognized the company in that case.

Mr. HOLT regretted that the surveyor was compelled to make such a representation, but he was obliged himself to acknowledge that it would be necessary to summon the contractors before a magistrate to account for the violation of the rules laid down for observance.

The CHAIRMAN said that it was highly necessary something should be done, as the streets, from their frequent disturbance, were really in a deplorable state, and this of course led to a sad interruption of the public traffic. His attention had been called a few days since to the state of Cannon-street, which had then sunk in one part so greatly as to be dangerous both to man and horse. In fact, if a horse fell in that locality at night, it would be a matter of difficulty to find him. Some understanding certainly must be come to with the company for the prevention of dangerous accidents. Certainly the Great Central Company had no right to open trenches anywhere, and at any time, without the knowledge or sanction of the officers of the commission.

Deputy STEVENS agreed with the chairman. The Great Central ought to be treated in the same way as any other company.

Mr. H. L. TAYLOR considered that as the new gas pipes were now laid down it was their duty to do all they could to lessen the evil. It was not any part of their business to defend either the Great Central or any other company. Their duty was to see that the public were inconvenienced as little as possible under the circumstances. He had called the attention of the chairman to the state of Cannon-street, which, he was glad to say, had been promptly attended to. He trusted that the inspectors would report upon the state of the streets, from time to time, that instructions might be given respecting the neglect or failure of any contracting parties.

Mr. BLAKE said the mischief complained of evidently arose from the lax performance of the duties of the commissioners themselves. (Hear, hear.) It appeared from the statement of the chairman of the Great Central Gas Company that no blame was attributable to that body, for that gentleman, upon whose honour the court placed every reliance, had clearly shown that no effort by which the occasional inconveniences occurring could be removed had been left unattempted, and that the contractors had been acting without the authority of the company, as well as without the authority of the court, in opening

the pavement so unceremoniously. (Hear, hear.) Probably if the court would issue peremptory directions to the inspectors the cause of complaint would not long continue.

Mr. H. L. Taylor thought that if they left it in that way nothing would be done. A direct step ought to be at once taken.

The Chairman: Before you decide, hear the reports of the inspectors.

The Surveyor suggested, in accordance with the hint given by Mr. Blake, that the inspectors in their respective districts should be empowered to summons the gas company if they opened any more holes without giving proper notice.

Mr. H. L. Taylor thought all directions of the kind would end in smoke. (Great laughter.)

Mr. Eagleton said the Great Central Gas Company would not think of complying with any directions. They were too well employed in riding rough-shod over the Commissioners of Sewers. (Laughter.)

Mr. Painter, inspector, reported several cases of breakage and of interruption to the public way, and also of escapes of gas, which had taken place in Cannon-street.

Mr. Mortimer, inspector, reported that much inconvenience, dissatisfaction, and danger had been incurred in consequence of the Great Central Gas Consumers' Company having neglected to give notice of trenches opened, or about to be opened, by them for services, escapes, or other purposes. He begged, therefore, to suggest that the said company should be required to enter into a book (to be kept at the Sewers office) a daily statement of all openings made by them, in conformity with the existing arrangements made with the other companies. His opinion was that if such a proposition was complied with, the officers of the court would be enabled to give directions to pave over the trenches as soon as they might be filled in.

After the reports of similar cases by the other inspectors, it was eventually decided that the clerk should write to the directors of the Great Central Gas Consumers' Company, calling their attention to the above circumstances, with a view to the adoption of a remedy for the evil in conformity with the above suggestions.

GREAT CENTRAL GAS CONSUMERS' COMPANY.

The second half-yearly general meeting of the shareholders in this company was held on the 30th ult. at the London Tavern, Bishopsgate-street; Mr. Thomas Dakin (chairman of the board of directors) occupied the chair.

The Secretary read the half-yearly report of the directors, which was as follows:—

"Report of the Directors of the Great Central Gas Consumers' Company, to the second half-yearly ordinary Meeting of the Shareholders, to be held at the London Tavern, Bishopsgate-street, on Wednesday, October 30, 1850.

"Gentlemen,—You are called together under the provisions of the company's deed of settlement, to the second half-yearly meeting of the company. The two extraordinary general meetings, so lately held under special circumstances, at which full reports were made of the state of the company's affairs and progress of the works, render it unnecessary to go into lengthened detail in our present report, which may be properly limited to the presentation of the following reports from the different officers of the company, viz., the engineers, the surveyors, and the auditors. The ordinary channels of public information will have acquainted the shareholders with many sources of persevering opposition with which the company has had to contend, but which has hitherto totally failed in its main objects.

"The proceedings which have been given at length in the daily journals of the legal proceedings instituted by the Chartered Gas Company, will have informed the shareholders how little they have to apprehend from this source; but as at present there is a negotiation for settlement going on at the suggestion of the Lord Chancellor, the directors do not deem it expedient pending the issue to further advert to this subject.

"In addition to the statement in your engineers' report, the directors have the satisfaction to state that, although in Mr. Burls', the secretary of the Chartered Company's, affidavit used in the late proceedings, the total number of consumers in the city is sworn to by him at 5500* (which, however, your directors cannot think a correct statement), up to this time 4660 services have been laid on to your mains; that 2800 meters have been fixed to consumers requiring new ones; and that more than 15,000 lights are now burning on the premises of the various customers, nearly the whole of which are most satisfactorily supplied with gas, both as to the brilliancy of the light and the quantity required, and that within the period of six weeks the whole of the contracting consumers will be supplied.

"The delay which has occurred in the completion of the works necessary for the entire supply of the consumers, has been a source of much anxiety to your directors, and has been a subject of constant remonstrance by them to the contractors.

"The financial statement embraced in the report is necessarily limited by the deed of settlement to a period of six weeks anterior to this meeting; but the directors have the pleasure to say that since that time £8500 has been received upon the last call as well as upon calls in arrear. The directors confidently hope that, from the continued support they are thus receiving from the shareholders, it will not be necessary to borrow the sum of money which they were empowered to take upon mortgage by the resolution of the extraordinary general meeting of the 14th of August, and confirmed by a subsequent meeting of the shareholders on the 4th day of September.

"The usual statement of the attendances of the directors at the board meetings and on committees, for the last half year, is herewith presented.

"By the provisions of the deed of settlement the following gentlemen go out of the direction by rotation; they offer themselves for re-election:—Messrs. Dakin, Gabriel, Bennoch, and Bovill.

"The directors have been occupied, during the past week, in considering the necessary staff of officers for carrying on the operations of the company and receiving applications; and they have the satisfaction of stating that the principle which they have adopted of paying a moderate salary, and making the larger emolument dependent on the success of the company, has been acceeded to by the officers appointed; showing their confidence in its ultimate results, and securing their zealous co-operation in the conduct of the business.

"On behalf of the Board,
(Signed) "Thomas Dakin, Chairman."

In reply to a question from Mr. Machin,

The Chairman said the directors had not made any charge for their services. That was a matter in which it rested with the shareholders themselves to take the initiative.

Mr. Hall asked if any definite sum had been fixed upon?

Mr. Hardwick replied that the deed of settlement provided that a general meeting from time to time should fix the amount of remuneration for the directors and the auditors.

Mr. Hardwick then read the report of Mr. Croll, the engineer of the company, as follows:—

"To the Directors of the Great Central Gas Consumers' Company.

"Gentlemen,—I have the honour to report that our works are nearly in a state of completion. Every effort has been made to get them completed and measured up, so as to finally arrange the accounts with the contractors in time for the shareholders' meeting to-morrow. That has been found impossible, but from what has been done I am enabled to state that the manufacturing apparatus is equal in efficiency and power to my designs, and I entertain no doubt that the total amount will not be found to exceed my estimate.

"I regret much that considerable delay has taken place in getting the services and meters fixed in time to enable us to avail ourselves of the demand of the consumers throughout the City. This has arisen partly from delays in casting various parts of the machinery, partly from negligence and treachery which has been detected on the part of the workmen engaged in laying the pipes, and partly from the obstructions occasioned by the suit instituted by the rival City Gas Company.

"As measures have been taken by the board to prevent the injurious action of all these causes, I need add nothing more on this head.

"Notwithstanding all these impediments to the full development of an anticipated supply, up to last night upwards of 2800 consumers, burning 15,000 lights, were supplied by your company's gas; this number is being daily increased as fast as the fitters can do their work.

"The gas is acknowledged to be of a superior illuminating power, and, with few exceptions, in the district supplied by the City Company, the quantity has been ample.

"An apparent deficiency in quantity has arisen in this district arising from the fact that the old City Company has been in the habit of working with an undue and wasteful pressure, in consequence of which gasfitters, having adapted their fitting to the pressure, have made them too small to pass freely gas supplied under the degree of pressure which gas companies ordinarily adopt.

"As you have now appointed your permanent staff of inspectors, I shall give them directions immediately to examine the fittings of each consumer; and, where they find it requisite, to make necessary alterations at this company's expense. This has already been done in several instances with complete success.

"In many cases it has been found necessary to increase the size of the fittings, as upon examination they were discovered to be choked with the impurity of the gas, accumulated by time; in such cases the obstructions have been removed, and the requisite amount of gas under our pressure has been freely passed.

"I have the honour to be, gentlemen, your obedient servant,
(Signed) "A. Angus Croll."

"Coleman-street, Oct. 29, 1850."

Mr. Hall then rose, and said it afforded him great pleasure to move the adoption of the reports just read, and that the proceedings of the board be approved and confirmed, and that the accounts to the 16th of September last be passed. He had served as one of the committee of shareholders for inspecting the books of the company to the minutest particulars; and he rejoiced to say that he had found everything perfectly satisfactory. The directors had performed all that could have been possibly expected of them; and their success had almost been as great as the shareholders could wish. He was sure, therefore, the meeting would join heartily in adopting the reports.

Mr. Thompson seconded the motion, and said the works of the company were of the most extraordinary character, and he could testify to their completeness. He was astonished at the rapidity with which they had been executed.

The motion for adopting the reports and accounts was then put, and carried unanimously.

* This number is exclusive of those in the City Gas Company's district, which must considerably exceed those in the Chartered Company's district.

Newent Gas Works.—Copies of the plans and specifications for these works may be inspected by intending contractors on application to the Editor.

Monster Pipes.—The New River Company have lately contracted with Messrs. Losh, Wilson, and Bell, of Newcastle-on-Tyne, for the supply of 1500 tons of cast-iron pipes, thirty-six inches in diameter, to be made upon Stewart's patented plan. This house had the contract for some pipes of the same description recently supplied to the Great Central Gas Consumers' Company, the excellent quality of which we noticed at the time.

Danger of Naphtha Lamps.—On the evening of the 29th ultimo Mrs. Lambert, coal dealer, 3, Parker-street, Drury-lane, was in the act of trimming a naphtha lamp, when the spirit ignited. Mrs. Lambert in her alarm dropped the lamp, and her clothes were saturated with the naphtha, and instantly she was in a blaze from head to foot. The unfortunate woman rushed into the street, the flames rising high above her head, and made her way into a butcher's shop in Drury-lane, the flames igniting a quantity of loose paper that was lying about, and nearly set the shop on fire. Some persons at length extinguished the flames by rolling her on the ground. Mrs. Lambert was so dreadfully burnt that the flesh came off her hands and body. She was taken to King's College Hospital. She is not expected to survive. A little girl, aged ten years, daughter of Mrs. Lambert, was also seriously burnt.

Share List.

THE PRICES QUOTED ARE THOSE AT WHICH THE LAST SALES HAVE BEEN MADE.

The Companies whose names are printed in italic type are incorporated by Act of Parliament.

Number of Shares issued.	Amount per Share £	Name of Company.	Amount paid up per Share £ s. d	Dividend per Cent. per Ann. £ s. d	Price. £ s. d
		ENGLAND.			
		Aberdare			
		Abergavenny			
		Aberystwith			
		Abingdon			
		Accrington £7000		5 0 0	
		Alcester			
		Alford, Lincolnsh.			
		Alfreton			
		Alnwick			
		Alston Moor			
250	10	Alton	10 0 0	5 0 0	10 0 0
800	5	Altrincham	5 0 0		
		Amlwch			
160	10	Ampthill	10 0 0	5 0 0	10 0 0
350	10	Andover	10 0 0	6 0 0	11 0 0
		Appleby			
		Arundel			
		Ashbourn, Derby			
		Ashburton			
		Ashby-de-la-Zouch			
		Ashford, Kent			
		Ashton-under-Line £39,700		10 0 0	
		Atherstone			
		Axminster			
225	20	Aylesbury	20 0 0	5 0 0	20 0 0
		Aylsham, Norfolk			
		Bacup, Yorkshire			
		Bakewell			
		Baldock			
140	25	Banbury	25 0 0		
		Bangor			
500	5	Barking, Essex	4 10 0	5 11 0	5 0 0
250	10	Barnard Castle	10 0 0	5 10 0	10 15 0
		Barnet			
		Barnsley £6000		7 10 0	
100	20	Barnstaple	20 0 0	7 10 0	25 0 0
		Barton			
120	25	Basingstoke	25 0 0	8 0 0	28 0 0
2400	20	*Bath*	16 0 0	6 0 0	25 to 30
		Battle £2000		6 0 0	
56	26½	Bawtry	26 10 0	5 0 0	25 0 0
		Beaumaris			
		Beccles, Bungay, and Lowestoft			
		Bedford			
		Belford			
		Bedale, Yorkshire			
		Belper			
		Beminster			
		Berkhempstead			
700	5½	Berwick-on-Tweed	5 10 0	6 8 0	5 15 0
		Beverley			
		Bewdley			
280	10	Bideford	10 0 0	6 0 0	10 10 0
		Biggleswade			
160	10	Bicester	10 0 0	5 0 0	10 0 0
		Bilston £15,100		6 10 0	
		Billericay			
		Bingley £7400		4 0 0	
		Birkenhead and Claughton £70,000	35 0 0	3 0 0	32 to 34
2400	50	*Birmingham and Staffordshire*	50 0 0	8 0 0	83½ to 84½
	25	*Ditto*, new shares	7 10 0	8 0 0	11 0 0
704	75	*Birmingham*	75 0 0	9 0 0	123 to 125
		Bishop's Auckland			
		Bishop's Stortford			
		Blackburn £30,000		10 0 0	
		Blandford			
		Blythe			
		Bodmin			
		Bognor			
		Bolton £38,582		9 19 5	
		Boroughbridge			
		Boston £8000		10 0 0	
200	10	Bourn	10 0 0	5 0 0	
		Brackley			
		Bradford, Wilts			
		Bradford, Yorksh. £45,000		9 10 0	
		Brampton, Cumb.			
		Brandon, Suffolk			
		Brecon			
		Bridge-end, Glam.			
		Brierly Hill			
2250	20	*Brighton*	20 0 0	5 0 0	14 to 15
1125	20	,, new shares	16 0 0	5 0 0	
		Brighton and Hove £50,276			
4250	20	*Bristol*	20 0 0	9 0 0	37 0 0
1725	25	*Bristol and Clifton*	25 0 0	6 0 0	25 0 0
		Brixham			
		Braintree			
750	50	*Brentford*	50 0 0	6 0 0	44 to 46
800	25	,, new shares	11 0 0	6 0 0	11 0 0
		Brentwood			
		Bridgwater £6000		5 0 0	
400	10	Bridlington	10 0 0		8 0 0
		Bridport			
		Brigg			
		Broadstairs			
100	50	Bromley, Kent	50 0 0	6 0 0	52 10 0
		Bromsgrove			
		Broughton			
120	10	Bruton	10 0 0	4 0 0	8 0 0
100	25	Buckingham	25 0 0	5 0 0	25 0 0
		Bungay (see Beccles)			
		Burford			
		Burnley £19,946		4 10 2	
		Burslem			
		Burton-on-Trent			
		Bury St. Edmund's £10,500		5 0 0	
		Bury, Lanc. £6570			
		Buxton			
		Callington			
		Calne, Wilts			
		Camborne			
		Cambridge £34,560		9 0 0	
240	50	*Canterbury* Gas and Water	50 0 0	6 0 0	57 to 58
240	25	*Ditto*, second issue	25 0 0	6 0 0	28 to 29
		Cardiff £12,000		7 10 0	
		Carmarthen			
		Chapel on the Frith			
		Chard			
		Chatham (see Rochester)			
		Chatteris			
		Cheadle			
		Chelmsford			
		Cheltenham £18,732		8 10 0	
		Chepstow			
		Chertsey			
230	10	Chesham, Bucks	10 0 0		
		Chester			
		Chester-le-Street			
		Chesterfield £13,123		4 17 6	
240	25	Chichester	25 0 0	6 0 0	30 0 0
		Chippenham			
		Chipping Norton			
		Chirk			
		Chorley			
		Chudleigh			
		Cirencester			
		Clifton (Bristol and Clifton)			
		Cleckheaton, York.			
		Clitheroe			
		Cockermouth			
		Colchester			
		Collumpton			
		Colne, Lancashire			
		Coleford, Gloucest.			
		Coggeshall			
		Congleton £5000		5 0 0	
		Cowbridge			
800	25	*Coventry*	25 0 0	6 0 0	20 0 0
		Cowes			
		Crewkerne			
		Croydon ... £20,000		5 0 0	
		Cranbrook ... £1900		5 0 0	
		Crediton			
		Crewe, Cheshire			
		Cricklade			
		Darlaston			
		Darlington			
250	20	Dartford	20 0 0	7 10 0	27 0 0
		Dartmouth			
125	20	Daventry	20 0 0	6 0 0	24 8 0
		Dawley, Shrop.			
		Dawlish			
500	6	Denbigh	6 0 0	5 0 0	6 0 0
820	10	Deptford	10 0 0	5 0 0	4 10 0
325	50	*Derby*	50 0 0	10 0 0	
90	20	Dereham (East)	20 0 0	4 10 0	
1000	5	*Dewsbury*	5 0 0	10 0 0	8 12 6
		Devizes			
4000	5	*Devonport*	5 0 0	6 0 0	6 5 0
		Doncaster			
280	25	Dorchester	25 0 0	5 0 0	25 0 0
120	25	Dorking	20 10 0	5 0 0	21 10 0
		Douglas, Isle of M.			
209	56½	*Dover*	56 10 0	4 15 4	55 0 0
		Downham			
		Driffield			
		Droitwich			
600	20	*Dudley*	20 0 0	4 0 0	15½ to 16½
		Dunmow			
		Dunstable			
		Durham			
276	9	Dursley, Gloster	9 0 0	5 10 0	8 0 0
		East Grinstead			
		Elland			
		Ellesmere			
		Enfield			
300	19	Epsom	19 0 0		
		Evesham			
		Exeter £40,000		10 0 0	
		Exmouth			
		Eye, Suffolk			
64	25	Fakenham	25 0 0	5 0 0	25 0 0
		Falmouth			
		Fareham			
120	25	Farnham	25 0 0	10 0 0	42 0 0
		Farringdon			
		Faversham			
		Ferrybridge			
		Fleetwood			
		Folkestone			
		Fowey			
240	5	Framlingham	3 10 0		
		Frome			
		Garstang			
		Gillingham, Dorset			
		Glastonbury			
		Glossop ... £10,000		9 0 0	
		Gloucester £25,000		7 10 0	
		Gomersal			
		Godalming			
		Gosport			
		Grantham			
		Gravesend			
1000	10	*Great Grimsby*	6 10 0	8 0 0	8 5 0
	25	Guildford	25 0 0	4 0 0	20 0 0
		Guisborough			
		Hadleigh			
		Hales Owen			
300	6	Halesworth	6 0 0	7 10 0	5 10 0
		Halifax £15,000		10 0 0	
		Halstead			
		Hampton Court			
		Harrogate £10,000		5 0 0	
		Hartlepool £15,137		7 10 0	
		Haslingden, Lansh.			
330	50	Hastings and St. Leonard's	50 0 0	6 0 0	60 0 0
		Haverfordwest			
		Haverhill			
		Haworth, Yorks.			
		Hayle			
		Helstone			
		Hemel Hempstead			
300	10	Henley-on-Thams.	10 0 0		
		Hereford £5300		4 0 0	
		Herne Bay			
		Hexham	10 0 0	7 0 0	12 0 0
270	10	*Heywood* £10,000		5 0 0	
		Hinckley	10 0 0	5 0 0	7 0 0
230	10	Hindley, Lancash.			
		Hitchen			
		Hythe			
		Hoddesden			
		Holbeach			
		Holmfirth £8880		3 10 0	
		Holyhead			
		Holywell (see British Provincial)			
		Honiton			
		Horncastle			
		Houghton-le-Sprg.	10 0 0	8 0 0	
10		Horsham			
		Howden			
		Hull, Sculcoats (see British Provin.)			
		Hull, £11,712. 10s.		5 0 0	
210	10	Hungerford	10 0 0	5 0 0	10 0 0
		Huddersfield			
520	5	High Wycombe	5 0 0		5 0 0
		Hyde, Cheshire			
		Ilminster			
		Ilford			
		Ilfracombe			
		Ironbridge			
1400	10	*Ipswich*	10 0 0	7 10 0	15 0 0
1400	10	,, new shares	5 0 0	7 10 0	
800	25	*Isle of Thanet* (Ramsgate&Mar.)	20 0 0	5 0 0	20 to 21
		Kendal £9100		8 15 0	
		Kenilworth			
		Keswick			
		Kettering	25 0 0	5 0 0	25 0 0
100	25	*Kiddermins.* £10000		5 0 0	
		King's Langley			
		Kington, Hereford			
		Kirkby Lonsdale			
		Kirkham, nr. Preston			
		Knutsford			
		Lancaster			
		Llanelly £3000		5 0 0	
		Llandovery			
		Leamington Priors £22,500		6 0 0	
		Leatherhead			
		Ledbury			
		Leeds Old Comp. old stk., £60,300		10 0 0	
		new ,, £23,775		6 0 0	
		Leeds New £60,000		10 0 0	
		Leek			
		Leicester ... £36,230		7 0 0	
		Leigh			
125	20	Leighton Buzzard	20 0 0	5 0 0	
		Leominster			
		Leyburn, Yorksh.			
		Liskeard			
330	25	Lewes	25 0 0	5 0 0	23 0 0
		Lincoln £8000		10 0 0	
		Leyland, Lancash.			
		Littlehampton			
250	20	Lichfield	20 0 0	7 10 0	27 10 0
		Liverpool United	100 0 0	9 0 0	174 to 176
		,, ¼ sh.	25 0 0	9 0 0	43¼ to 43¾
		Langport			
5000	40	London Comps.—*British*	18 0 0	5 0 0	12 to 14
		,, debentures £46,300		4 0 0	
5000	20	,, Provincial—(Gloucester, Holywell, Hull, Norwich, Stoke, Trowbridg)	20 0 0	7 0 0	17 to 19
	20	,, Prov., new	6 0 0	7 0 0	4 to 5
	25	*Commercial*	25 0 0	6 0 0	23½ to 24½
	25	,, new shres	10 0 0	6 0 0	¼ dis.
	25	,, ,,	2 10 0	6 0 0	¼ dis.
12,000	50	*Chartered*	50 0 0	6 0 0	45 to 47
6000	50	,, new shares	10 0 0	6 0 0	9 to 9½
2000	150	*City of London*	150 0 0	5 0 0	160 0 0
4000	50	*Equitable*	50 0 0	2 10 0	25 to 28
		,, debentures £51,000			
10,000	20	European—(Amiens, Boulogne, Caen, Havre, Nantes, and Rouen)	20 0 0	5 0 0	9 to 10
		,, do. new			2 to 2¼

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
15,000	10	Gt.Cntl.Consumers	10 0 0		
8000	50	*Impl.Continental* —(Amsterdam, Aix-la-Chapelle Antwerp, Berlin, Bordeaux, Brussels, Cologne, Frankft., Ghent, Haarlem Hanover, Lille, Marseilles, Rotterdam, Toulouse, Vienna)	42 0 0		40 to 45
7000	50	„ new shares	38 0 0		45 to 50
	50	„ third issue	42 10 0		40 to 45
10,000	50	*Imperial*	50 0 0	6 0 0	68 to 70
3000	50	„ new shares	35 0 0	6 0 0	50 0 0
		„ debentures £50,500			
4000	40	*Independent*	40 0 0	6 0 0	47 to 49
8000	25	*London*	25 0 0		8 0 0
6000	25	„ preference	25 0 0	6 0 0	19 to 21
		„ debentures £150,000			
9000	50	*Phœnix*	49 0 0	4 10 0	27 to 29
1000	100	*Ratcliff*	90 0 0	5 0 0	58 to 60
4000	25	*South Metrop.*	25 0 0	6 0 0	23 to 24
9000	50	United General— (Cork, Dublin, Limerick)	50 0 0	2 0 0	15 to 15½
12,500	20	Western	18 0 0		7 0 0
		Lostwithiel			
		Loughborough			
240	25	*Louth*	25 0 0	6 0 0	26 10 0
		Lowestoft (see Beccles)			
611	5	Ludlow Union	5 0 0	6 0 0	5 0 0
		Luton			
		Lyme Regis			
		Lymington			
		Malmesbury			
		Macclesfield £32,000		3 15 0	
		Maidenhead			
250	50	Maidstone	50 0 0	10 0 0	100 0 0
		Maldon			
		Marlborough			
		Malton (New)			
		Malvern			
		Manningtree			
		Mansfield £5000		10 0 0	
		March			
		Margate(see I. of T.			
		Market Deeping			
132	25	Market Harboro'	25 0 0	6 0 0	30 0 0
		Market Raisin			
		Market Weighton			
		Marlow			
370	10	Maryport	10 0 0	6 0 0	12 0 0
		Melksham			
		Melton Mowbray			
		Merthyr Tydvil			
		Mere			
		Middleton £9039		5 0 0	
		MidsummerNorton			
		Middlesboro'			
		Mildenhall			
		Mitcham			
		Mold			
700	10	Monmouth Gas and Water	10 0 0	5 0 0	
		Monk Wearmouth			
		Moreton in Marsh			
		Morley			
		Mottram			
		Nantwich			
		Neath			
		Needham Market			
		Newark £5000		10 0 0	
250	20	Newbury	20 0 0	5 0 0	20 0 0
13,000	5	Newcastle & Gateshead Union	5 0 0	8 0 0	6 12 6
		Newcastle-under-Lyne £6200		4 0 0	
600	5	Newmarket	5 0 0	6 0 0	5 0 0
		Newnham, Glost.			
		Newent			
		New Mills & Hayfield £2115			
		Newport, M. £11720		8 0 0	
320	50	*Newport, Isle of W.*	38 0 0	4 0 0	19 to 20
		Newport Pagnell			
		Newport, Salop			
		Newton Abbot			
		Newton, Lanc.			
		Northallerton			
		North Walsham			
		Northampton			
		Northwich			
		Norwich (see British Pro. £40,000		7 0 0	
900	50	*Nottingham*	50 0 0	10 0 0	
900	50	New shares		10 0 0	
		Nuneaton			
		Oakham			
		Oakhampton			
200	10	Odiham, Hants	10 0 0	3 10 0	10 0 0
		Oldham			
		Ongar			
		Ormskirk			
		Otley, Yorkshire			
		Oundle			
		Oxford £18,000		9 10 0	
		Over Darwen £8000		5 0 0	
		Padstow			
		Pately Bridge, Yrk.			
250	20	Penrith	15 0 0	6 10 0	21 0 0
		Penryn			
		Penzance			
200	10	Petworth	10 0 0	9 10 0	12 0 0
		Pickering			
3000	10	*Plymouth & Stonehouse*	10 0 0	6 0 0	11 0 0
		Pocklington			
		Pontefract			
		Pontypridd			
400	10	Poole	10 0 0	5 0 0	10 0 0
		Port Madoc			
600	50	*Portsea Island*	53 0 0	5 0 0	45 to 47
400	10	Prescott	9 0 0	4 13 4	7 0 0
		Preston £52,500		10 0 0	
		Pwllheli			
		Pontypool			
		Pudsey £12,000		5 0 0	
		Radcliff and Pilkington £9000		4 12 10	
		Ramsay, I. of Man			
		Ramsgate (see Isle of Thanet)			
		Ravenglass			
1000	10	*Reading*	10 0 0	3 0 0	7 0 0
500	20	*Reading Union*	20 0 0	6 0 0	17 0 0
		Redditch			
		Redruth			
		Reigate			
		Retford (East)			
		Rhyl			
		Richmond, Surrey			
		Ripon			
		Rochester and Chatham £20,000		6 0 0	
		Rochford			
		Rockingham			
		Romford			
		Ross			
		Rotherham £6100		10 0 0	
		Royston			
		Ruabon			
		Rugby			
		Rugeley			
		Ruthin			
		Runcorn £11,000		7 10 0	
500	10	Ryde	10 0 0	6 0 0	12 0 0
		Rye			
		Romsey			
		Saddleworth			
225	20	Saffron Walden	20 0 0	3 15 0	19 0 0
		St. Austel			
		St. Asaph			
		St. Colomb			
		St. Helen's £7500		7 10 0	
		St. Helier's (Jersey)			
		St. Ives, Hunting.			
		St. Ives, Cornwall			
250	10	St. Neot's	10 0 0	8 0 0	12 0 0
		St. Peter's Port, (Guernsey)			
320	25	Salisbury	25 0 0	6 0 0	28 to 30
		Sandbach			
140	10	Saxmundham	10 0 0	5 0 0	10 0 0
		Scarborough			
		Seaham Harbour			
		Selby			
		Settle			
290	10	Sevenoaks	10 0 0	5 0 0	10 0 0
		Shaftesbury			
5400	25	*Sheffield United*	24 0 0	8 6 8	32 0 0
		Shelton, Potteries (see Brit. Prov.)			
		Shepton Mallet			
		Sherborne			
2914	5	Shields, North (Tynemouth)	5 0 0	3 0 0	5 0 0
		Shields (South)			
		Shiffnal, Salop			
		Shipley £4500		None	
		Shipston-on-Stour			
		Shoreham			
		Shrewsbury £10,000		7 0 0	
400	10	Skipton	10 0 0	4 0 0	11 0 0
		Sleaford			
250	10	Slough	10 0 0		
		Snaith			
		Soham			
		Southwold			
		South Molton			
1000	50	*Southampton*	32 0 0	5 0 0	
		Sowerby, Yorksh.			
		Stretford			
		Stokesly			
		Stafford £10,000		5 0 0	
		Staines and Egham			
		Staley Bridge £15,000		10 0 0	
		Stamford £11,250		3 0 0	
		Stockton-on-Tees £7980		9 5 0	
840	9½	Stockton, New	9 10 0	9 0 0	8 0 0
960	10	Stoke-upon-Trent	10 0 0	5 10 0	10 0 0
500	10	„ new shares	4 0 0	5 10 0	10 0 0
		Stone, Stafford			
		Stoney Stratford			
		Stourbridge			
		Stowmarket			
150	20	Stratford-on-Avon	20 0 0	7 10 0	30 0 0
		Stroud			
169	10	Swaffham	10 0 0	5 0 0	5 10 0
		Swansea £9000			
		Sudbury			
		Sunderland, old			
6400	5	*Sunderland*, new	5 0 0		
		Sutton			
		Swindon			
2800	5	*Taunton*	5 0 0	None	2 10 0
		Tadcaster			
		Tamworth			
		Tavistock			
		Teignmouth			
		Tenbury			
		Tenby			
		Tenterden £2000		2 10 0	
		Tetbury, Gloster			
		Tewkesbury			
		Thame			
		Thetford			
		Thirsk			
		Thornbury			
		Thorne			
		Tiverton			
670	5	Todmorden	3 0 6		
		Torquay			
		Torrington, Devon			
		Totnes			
		Totnes and Bridgetown Consumers			
4000	5	Tottenham	3 10 0	6 0 0	3 0 0
		Towcester			
		Tring			
		Trowbridge (see British Provin.)			
75	50	Truro	50 0 0	2 0 0	
		Tunbridge			
		Tunbridge Wells			
		Ulverston			
		Uppingham			
240	5	Upton-on-Severn	5 0 0	5 0 0	5 0 0
		Usk, Monmouth			
		Uttoxeter			
		Uxbridge			
1000	25	*Wakefield*, old capl.	25 0 0	6 0 0	25 0 0
1600	5	„ new „	5 0 0	6 0 0	5 0 0
300	10	Wallingford	10 0 0	5 0 0	8 0 0
		Wandsworth			
		Wantage			
		Warrington £23304		10 0 0	
100	10	Wareham	10 0 0	3 10 0	8 0 0
120	25	Warminster	25 0 0	5 0 0	27 0 0
		Warth			
		Warwick £15,000		6 0 0	
		Watford			
		Welchpool, Mntgy.			
		Wellingborough			
		Wellington, Salop			
		Wellington, Smrst.			
		Wells, Smrst. £5000		7 10 0	
		Westbury			
		Weston-sup.-Mare			
2000	5	West Ham	5 0 0	6 0 0	5 0 0
		Whitby			
		Whitehaven			
		Whittlesea			
		Wigan £10,160		12 10 0	
		Willenhall			
		Winchelsea			
		Winslow			
240	10	Wimborne Minster	10 0 0		
		Wincanton			
360	50	Winchester	50 0 0	6 0 0	
900	12½	Windsor	12 10 0	10 0 0	23 0 0
		Witham			
		Witney			
4448	10	*Wolverhampton*	10 0 0	7 0 0	15 0 0
		Woburn			
210	10	Wokingham	10 0 0		10 0 0
		Woodbridge			
		Wooler			
		Wotton-un.-Edge			
		Worcester £29,000		8 0 0	
		Workington			
		Worksop and Radford			
		Wirksworth			
		Worthing			
		Wrexham			
		Woolwich			
		Woolwich Consms.			
		Woolwich (North)			
		Wymondham			
		Yarm			
795	20	Yarmouth	20 0 0		15½ to 16½
		Yeovil			
		York Untd. £55,000		7 0 0	

SCOTLAND.

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Aberdeen			
		Airdrie			
		Alloa			
		Annan			
		Anstruther			
		Ardrossan			
550	20	Arbroath	20 0 0	7 10 0	7 10 0
		Auchterarder			
750	2	Auchtermuchty	2 0 0	6 0 0	2 10 0
		Ayr, old			
		Ditto, new			
		Banff			
		Barrhead			
		Bathgate			
		Beith			
		Bervie			
		Biggar			
		Blairgowrie			
300	6	Borrowstowness	6 0 0	5 0 0	8 0 0
		Brechin			
		Bridge of Allan			
		Broughty Ferry			
		Burntisland			
		Callen			
		Campbelton			
		Clackmannan			
		Coatbridge			
		Coldstream			
		Collinsburgh			
		Crieff			
		Crail, Fife			
		Cumbernauld			
		Cumnock			
600	5	Cupar Angus	5 0 0	6 0 0	5 10 0
250	10	Cupar Fife	10 0 0	7 10 0	14 0 0
		Dalkeith			
		Dingwall			
		Dornoch			
		Douglas			
		Dumbarton			
400	20	Dumfries	14 0 0	5 0 0	20 0 0
		Dunbar			
		Dunblane			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Dundee, old	£29,687	4 4 0	
		„ new	£33,851	2 10 0	
860	10	Dunfermline	10 0 0	6 0 0	12 12 0
		Dunkeld			
		Dunse			
		Dysart			
6000	25	*Edinburgh Gas Co.*	25 0 0	10 0 0	45 0 0
		„ *and Leith Co.*			
			£98,640	6 10 0	
		Elie			
		Elgin			
		Falkirk, old			
		„ new			
		Falkland			
		Ferry-Port on Craig			
		Fochabers			
		Forfar			
		Fort William			
		Fraserburgh			
		Gaiashiels			
		Garlieston			
		Gatehouse n. Fleet			
		Girvan			
		Glasgow	£122,500	7 10 0	
15000	10	*Glasgow City and Suburban*	9 0 0	6 10 0	9 0 0
		Grangemouth			
		Haddington			
		Hamilton	£7500	8 0 0	
		Hawick			
		Helensburgh			
		Huntly			
		Inverary			
400	1	Inverkeithing	1 0 0	5 0 0	1 0 0
1200	10	*Inverness Gas and Water*	10 0 0	5 10 0	15 0 0
2400	5	„ new shares	1 5 0	5 10 0	2 5 0
		Irvine			
		Jedburgh			
		Johnstone, near Paisley			
		Keith			
		Kelso			
		Kilmarnock			
		Kincardine			
		Kinghorn			
		Kingskittlo, Fife			
		Kinross			
		Kirkaldy			
320	5	Kirkcudbright	5 0 0	5 0 0	5 0 0
1000	3	Kirkintulloch, near Glasgow	3 0 0	5 0 0	3 0 0
227	5	Kirkwall	5 0 0	5 0 0	4 10 0
518	5	Kirriemuir	5 0 0	6 0 0	
		Lanark			
		Largo, near Leven			
		Largs			
		Lasswade, n. Edin			
		Lauder			
		Leith			
		Leslie, Fife			
		Lesmahago			
		Leven			
		Linlithgow			
		Linton, n. Nobleh.			
		Lochee, n. Dundee			
		Lochgilphead			
		Lochwinnock, near Paisley			
1200	1	Markinch	1 0 0	7 10 0	1 5 0
		Mauchline			
		Maxwell-town, n. Dumfries			
		Maybole, Ayrshire			
		Maryhill, near Glasgow			
		Melrose			
718	2	Mid & East Calder	2 0 0		2 0 0
192	5	Moffat	5 0 0		
13½		Montrose	13 10 0	7 11 1	
		Musselburgh			
		Nairn			
		Neilston, n. Glasg.			
		Newmills, near Kilmarnock			
		Newburgh, Fife			
		Newton Stewart			
		North Berwick, n. Haddington			
		North Queensferry			
		Oban			
		Peebles			
800	25	Perth	25 0 0	1 4 0	22 10 0
		Peterhead			
		Pittenweem			
		Pollokshaws, near Glasgow			
		Port Glasgow			
		Portobello, near Edinburgh			
		Prestonpans			
		Rutherglen, near Glasgow			
		Renfrew, n. Paisley			
		Saltcoats			
		Sanquhar			
		Selkirk			
		South Queensferry			
		St. Andrew's			
		Stewarton			
		Stirling			
		Stoneheavn			
		Stonhouse, Laurks.			
		Stornoway			
		Stranraer			
		Strathaven, near Hamilton			
		Thurso			
		Tillicoultry, n. Alloa			
800	1	Tranent	1 0 0		1 0 0
		Troon			
		Wick			
		Wigton			
		Wemyss	4 10 0		
		IRELAND.			
300	10	Armagh	10 0 0	8 0 0	14 10 0
		Ballinasloe			
700	50	*Belfast*	50 0 0		
		Ballymena			
		Ballymona			
		Carrick-on-Suir			
		Carrickfergus			
		Carlow, new			
		Cork (see United General)			
		Clonmel Consumrs			
		Drogheda			
19,000	10	*Dublin Consumers*	5 0 0	7 0 0	6 0 0
		Dublin Hibernian (see United Gen.)			
160	25	Dundalk	25 0 0		22 0 0
		Dungannon			
1000	5	*Downpatrick*	5 0 0		
		Enniskillen			
		Galway			
400	10	Kilkenny	10 0 0	8 0 0	11 5 0
		Limerick (see U.G.)			
1725	5	Limerick Consum.	5 0 0	5 0 0	5 0 0
600	15	Londonderry	15 0 0	6 13 4	21 10 0
500	7	Lisburn	7 0 0	6 5 0	7 0 0
520	10	Lurgan	6 0 0	6 0 0	6 0 0
		Mallow			
		Monaghan			
		Nenagh			
448	5	Newtownards	5 0 0	4 0 0	5 0 0
		New Ross			
		Newry			
		Omagh			
125	20	Portadown	20 0 0	5 0 0	20 0 0
600	10	Sligo	10 0 0		
		Tipperary			
		Tralee			
		Waterford			
		Wexford			

The Gas Works in the undermentioned towns belong to private individuals:—

Bridgenorth.	Farsley.	Holt.	Oswestry.	Sidmouth.	Ware. (2 works)
Carlow, old.	Gainsborough.	Huntingdon.	Peterborough.	Sittingbourne.	Wem.
Carnarvon.	Goole.	Kingston-on-Thames.	St. Alban's.	Spalding.	Weymouth.
Deal.	Harleston	Lynn.	Sandwich.	Stockport	Whitchurch (Salop).
Diss.	Hertford.	Morpeth.	Sheerness.	Waltham Abbey.	Wisbeach.
Ely.					

The Gas Works belong to the Corporations, or to Commissioners acting under special acts of Parliament, in the following towns:—

Carlisle.	Keighly.	Manchester.	Rochdale.	Salford.	Walsall.
Cashel.	Knaresborough.	Milton (Kent).	Rothesay.	Southport (Lane.)	Wells (Norfolk).
Coleraine.	Lytham (Lane.)	Paisley.	Richmond (Yorkshire).	Strabane.	Youghall.
Greenock.					

Price Current.

The following List of Prices is corrected by an eminent wholesale house in each trade up to the latest period:—

CASTINGS, per Ton.

Average Weight of Cast Iron Pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow	Newcastle.	Wales.	Yorksh., Derbysh. and Staffdsh
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	3 7 6	2 10 0	3 0 0	3 15 0	3 10 0
1¼ and 2 inches Socket Pipes	6 0 0	5 0 0	5 10 0	5 15 0	5 15 0
2½ and 3 do. do.	5 17 6	4 17 6	5 7 6	5 12 6	5 12 6
4 and 5 do. do.	5 15 0	4 15 0	5 5 0	5 10 0	5 10 0
6 inches and upwards do.	5 12 6	4 15 0	5 2 6	5 7 6	5 7 6
Extra for bends, branches, and connection	2 0 0	2 0 0	2 0 0	2 0 0	2 0 0
Retorts, 1st fusion	5 5 0	..	..	4 17 6	5 0 0
Do. 2nd fusion	5 15 0	4 10 0	4 17 6	5 5 0	5 5 0
Tank Plates, ⅜ thick and above	5 10 0	4 17 6	5 0 0	5 7 6	5 17 6
Do. less than ⅜	5 15 0	5 0 0	5 0 0	..	5 10 0
Plain Castings ex. models	5 15 0	5 0 0	5 0 0	5 10 0	5 10 0

COALS.

NEWCASTLE. Unscreened.	s. d.	DERBYSHIRE. Unscreened.	s. d.
Tyne Main	5 6 per ton.	Clay Cross	6 6 per ton.
Ravensworth Pelaw	5 9 „	Deep Main	
Dean's Primrose		New Birchwood	
Pelton	6 0 „	New Shipley	
Brancepeth		Sleight's	
Medomsley		**SCOTCH CANNEL.**	
New Tanfield		Kirkness best	23 0 „
Pelaw	6 3 „	Lothian	18 0 „
Eighton Moor	6 6 „	Lesmahago at Glasgow	16 6 „
Felling Main		Ditto at Leith	18 0 „
New Pelton		Wemyss	15 0 „
Peareth		Dombristle	13 0 „
South Pelaw		Lothans	
Waldridge		Bridgeness	11 0 „
South Peareth		Kinneil	
Ramsay's Cannel	12 0 „	Lochgelly	10 0 „
		Lumphumary	

FIRE GOODS.

Best Fire Bricks, 50s. per thousand, at Newcastle.
Do. Clay, 12s. per ton do.

WROUGHT IRON TUBING, subject to 40 per cent. Discount.

	2 inches.	1½ inch.	1¼ inch.	1 inch.	¾ inch.	½ inch.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent welded tubes, from 4 to 12 feet, per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto „ 2 to 4 feet	One penny per foot extra.					
Ditto „ 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting pieces, or long screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, springs, and elbows, wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing sockets, caps, plugs, and nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain sockets	1 0	0 8	0 7	0 5	0 4	0 3
Flanches	1 9	1 6	1 3	1 0	0 9	
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	

FREIGHTS, per Ton.

Coastwise—Newcastle.	s. d.		s. d.
Chatham & Roches.	6 0	Weymouth	8 3
Cork	8 6	Yarmouth	6 0
Dover	6 6	*Foreign.*	
Dublin	9 0	Amsterdam	10 0
Exeter Quay	9 0	Boulogne	7 6
Folkestone	7 3	Barcelona	20 0
Hastings	7 6	Bordeaux	11 0
Ipswich	6 0	Calais	7 6
Jersey	9 0	Dieppe	8 6
London	6 6	Hamburg	9 9
Lowestoft	6 0	Havre	9 0
Lynn	6 6	Lisbon	12 0
Margate	6 6	Rotterdam	9 0
Portsmouth	8 0	Rouen	11 6
Plymouth	8 0	St. Petersburgh	11 0
Southampton	8 3	Stettin	7 0
		Trieste and Venice	23 0